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A Case of Tetanus in a Cat.

Paul Fildes, Tom Hare and J. G. Wright.

The following appears to be the first recorded isolation of *Cl. tetani* from a clinical case of tetanus in the cat.

CLINICAL HISTORY.—A black male cat, aged about two years, was admitted to the Royal Veterinary College Hospital. Ten days previously it was found caught in a trap; its left fore limb, one inch above the carpus, was gripped tightly by a wire snare. Examination revealed a transverse fracture of the lower third of the left radius, dry gangrene of the distal part of the limb and a trace of pus in the superficial laceration produced by the snare. Two days later the left fore limb was amputated one inch below the elbow joint under avertin narcosis (0·25 c.cm. per kg.) augmented with a little chloroform. The cat slowly recovered from narcosis, but on the second day after the operation it showed clinical evidence of tetanus. At regular intervals of about five minutes duration the cat fell on its side with tonic spasm of the back, loin and hind limbs and clonic spasms of the fore limbs and neck muscles; after each "fit," which lasted about one minute, the cat sat up with a dazed expression and uttered a distressed cry. Gradually the interval between the "fits" was reduced and within 24 hours of the onset the whole body, with the exception of the jaws, was in complete tonic spasm. The cat was destroyed (humane killer) on the 15th day after the accident. The symptoms were of the ascending type; no trismus was observed.

POST-MORTEM EXAMINATION.—The carcass was in good condition and showed no evidence of mechanical injury other than the operation. The stump of the left fore limb was removed at the axilla for bacteriological examination; no abnormality of the left axillary lymphatic glands was found.

The liver was slightly paler and softer than normal; the cut surface of its greyish-brown coloured parenchyma was irregularly dotted with yellowish to white opaque coloured areas of necrosis and streaked with linear hæmorrhages. The cortex of the kidneys was acutely congested. The greater part of the brain was destroyed by the "humane killer." No other abnormality was found; the spinal cord was not examined.

HISTOLOGICAL EXAMINATION.—Sections of the liver showed some fatty degeneration with a superimposed slight acute necrosis of cells in the central zone, a slight infiltration of the central zones by neutrophil leucocytes and acute venous congestion. The kidney showed acute venous congestion with œdema of the glomerular tufts, some of which contained small deposits of blood pigment. No bacteria were found in the liver and kidney.

It appears probable from comparison with sections in other cases that the liver necrosis was due to the anæsthesia.

BACTERIOLOGIGAL EXAMINATION.—(*a*) *The amputated limb.* Cultures taken from the gangrenous and septic area at the site of the fractures were grown in cooked meat medium for two days and then subcultured upon sloped tubes according to the technique described by one of us (P.F.). In 24 hours a film growth was found in all tubes with the filamentous upper edge typical of tetanus bacilli. These filaments being subcultured gave pure cultures which upon subsequent test gave the morphological and cultural reactions of tetanus bacilli, agglutinated by a polyvalent serum and toxic to guinea-pigs. (*b*) *The amputated stump after death.* Tetanus bacilli were isolated from the tissues at the site of operation, although these looked normal.

In the review of tetanus by one of us (P.F.) in the Medical Research Council's *System of Bacteriology* it appears that clinical tetanus in the cat has not been recorded, at any rate in a readily accessible journal. The obvious explanation of this rarity is the fact that a cat is over 2,000 times more resistant to toxin than is, for instance, a horse. Of 15 cats inoculated with 5 c.c. of a toxin, fatal to guinea-pigs in a dose of 0·0001 c.c., only five died of tetanus, the remainder remaining with the local condition. Thus it would be necessary to induce a much greater production of toxin and hence a much wider dissemination of growing bacilli than ordinarily occurs in nature, in order to kill a cat with an infection by tetanus spores.

In the present case these conditions were probably achieved. Owing to the constriction of the snare the distal part of the limb was deprived of blood supply to such an extent that it became gangrenous. This part of the limb would, therefore, constitute an adequate medium for the growth of the bacilli. Instead of remaining at the point of entry, they would grow into the surrounding necrosed tissues and produce a much greater volume of toxin than usual, until sufficient was absorbed to break down the resistance of the animal.

Undulant Fever in New South Wales.

According to A. H. Tebbutt and H. T. Marsh (*Med. Journ. Australia*, February 7th, 1931, p. 170) the first case of undulant fever reported in Australia was of foreign origin, and was recorded by Dixon in 1908. The patient was a Maltese who had been drinking goat's milk in Malta and became ill 27 days after leaving that island, subsequently being treated in Sydney Hospital. *Br. melitensis* was agglutinated in a dilution of 1 in 60 first, and then of 1 in 200; during a relapse this organism was recovered from his blood. The first indigenous cases in Australia were reported by Penfold and Butler in 1930. In one of their two patients the diagnosis was made by both blood culture and the agglutination test, and in the other by agglutination alone. The present authors now record a case—the first indigenous case to be reported in New South Wales—in a dairy farmer, aged 51, who had been handling aborting cattle. The diagnosis was made by the agglutination test (1 in 640 of *Br. abortus*).—*British Medical Journal.*

DEPT. OF VET. MEDICINE

A Few Notes on Lead Poisoning in a Herd of Dairy Cows.*

By

Horace L. Roberts, F.R.C.V.S.

Remembering the injunction of our honorary secretary: "Do not make a long paper of your notes, let it be something productive of discussion," I trust you will consider this effort to collate the experience gained in the cowshed and on the pasture will, by reason of its omissions, fulfil the essentials required for a helpful discussion by the fellows of the Central Society.

On October 8th, 1930, I was asked by the commercial manager of a beet sugar company, to investigate some cases of sudden illness and deaths in a herd of dairy cows which were apparently due to an obscure cause.

The owner's veterinary surgeon, Mr. W. J. Browning, M.R.C.V.S., and myself, met the manager and the factory's chemist at the farm the same day.

On arrival, I ascertained that two freshly-calved cows had died after a few hours' illness during the previous two days. Mr. W. J. Browning informed me that the *post-mortem* appearances of the viscera were similar in each carcass, inasmuch as he noticed zebra-like markings of regular formation on the mucosa of the caecum, and an excessively dry condition of the contents of the omasum was also observed. In a loose box adjacent to the cow-house were two recently-calved cows suffering from some acute poisoning. The first cow was lying on its side, ropy saliva literally poured out of its mouth and collected around the animal's lips and on the floor, tonic and clonic spasms of the voluntary and the involuntary muscular systems were persistent.

The second cow was recumbent, eyes sunken, head hung down, temperature normal, pulse weak and thready, emaciated, and the animal was unable to control the voluntary muscles of the neck and head.

Both these cows died without regaining consciousness. The *post-mortem* examination of each carcass did not reveal to us any gross macroscopic lesion.

The *ante-mortem* appearance of these two animals gave me the impression that a mineral which had been ingested by them with the food or water was the sole cause of all the toxic symptoms exhibited.

I forwarded a portion of kidney, liver, and some of the contents from the rumen of No. 1 cow to Dr. Clough, Professor of Chemistry and Toxicology, the Royal Veterinary College, London, for his analysis and report.

On October 11th, Dr. Clough reported: "I find lead is present. I separated approximately 1/50th part of a grain of lead from one ounce of the organs and contents; there is no doubt that acute or sub-acute lead poisoning was the cause of death."

The allegation of the owner was that some form of lead was conveyed to the animals in a recently arrived sample of beet sugar pulp which had been fed to the cows. The consignment of pulp consisted of 30 bags of fresh pulp. Some of it was given to 28 cows in milk, and to one bull, commencing on Friday afternoon, September 26th; almost immediately, that is to say on September 27th, illness was apparent: 6 recently calved cows were taken ill between September 27th and October 6th.

One cow died on October 3rd; one on October 7th; one on October 8th; one on October 9th; one on October 10th; one on October 14th.

In addition, there remained on October 11th seven other cows ill, *viz.*:—*Beauty, Beccles Lass, Clove, Marigold, Beeswing, Elsie* and *Dimple.*

On October 13th, the cows, *Poppy* and *Primrose* were noticed to be affected.. On October 14th a young red poll cow *Anne* was added to the list of those visibly ill.

The cow *Beauty* died on October 28th; I forwarded portions of the kidney and liver to Dr. Clough, who reported lead to be the cause of death.

The cow *Clove* lingered in an emaciated condition until March 3rd of this year.

The cow *Poppy* aborted; regarding the cow *Pansy*, and another cow, *Peggy*, each was delivered of a dead calf; *Marigold* calved a live calf of normal size. None of these cows came to her proper milk flow, and all of them again showed slight symptoms of lead poisoning shortly after parturition.

I may say the other cows which were dry on September 26th and 27th, and therefore did not receive any of this pulp, calved down all right and remained in full lactation.

I have previously stated that the *post-mortem* examination on the two cows which we made on October 8th and 9th did not reveal any gross macroscopic lesion; I now wish to say, with a certain amount of emphasis, that neither Mr. Browning nor myself was able to discover a blue line on the gums of either the upper or lower jaws of any of the affected animals either before or after death.

. . . . .

The acute form of lead poisoning in dairy cows is rapid in its onset, but in some instances it gradually gives way to the sub-acute form, which, if the animal survives, is succeeded by chronic plumbism extending over a period of several weeks or months.

In those animals which do not succumb after a short illness the acute symptoms continue in a less aggravated form for a few days.

The first symptoms noticed are dulness; loss of milk and appetite; suspension of rumination; discharge from the eyes, with photophobia—eyelids are swollen; nasal discharge is present; there is grinding of the teeth; profuse salivation; rapid wasting, and constipation of the bowels with the passage of hard, black fæces; "grunting," which is frequently noticed in bovine dyspepsia, is absent. These early symptoms are quickly followed by colic, convulsions, coma and death.

In the sub-acute cases, the central nervous system becomes affected; according to the individual, delirium and/or mental aberration is manifested by the affected

* Paper presented to the Central Division N.V.M.A., at 10, Red Lion Square, W.C.1., on June 4th, 1931.

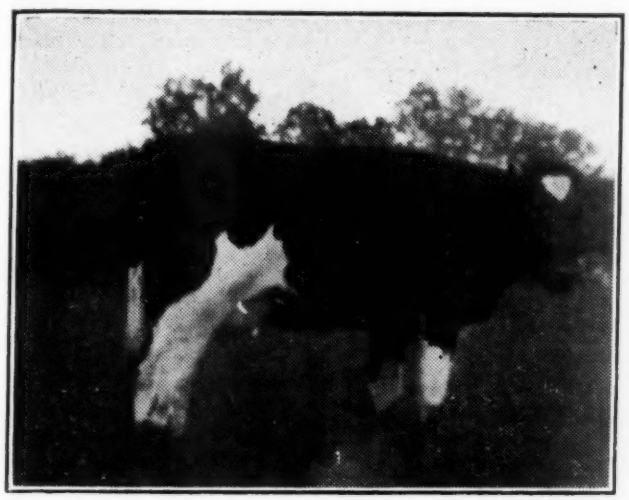

Fig. I.

"Beeswing"—Taken October 22nd, 1930.

Standing with portion of sugar-beet top between her lips, but unable to pass it backwards into the cavity of mouth owing to paralysis of tongue.

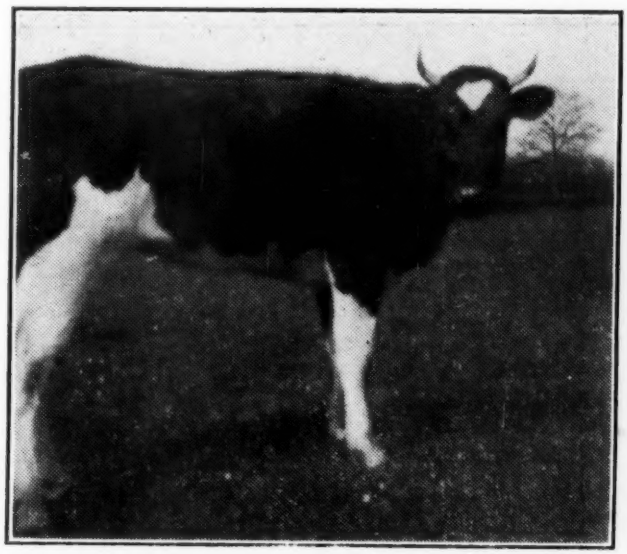

Fig. II.

"Beeswing"—Taken April 23rd, 1931.

Marked emaciation. This cow was taken ill, shortly after calving, on October 10th, 1930. Note atrophy of udder.

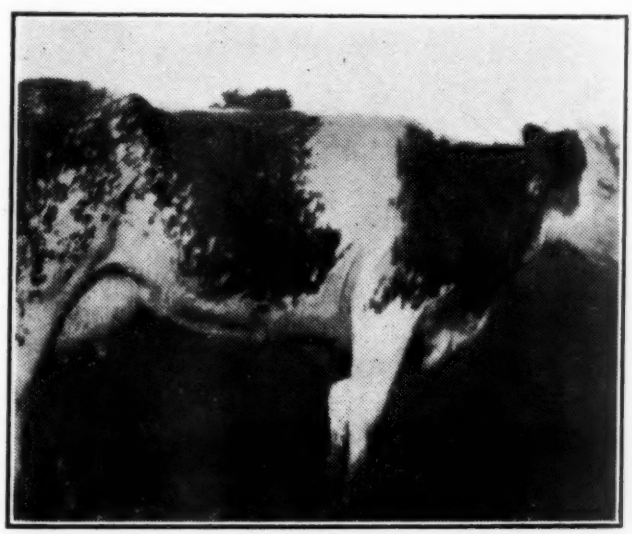

Fig. III.

"Beauty"—Taken October 13th, 1930.

Rapid wasting. This cow died on October 28th, 1930.

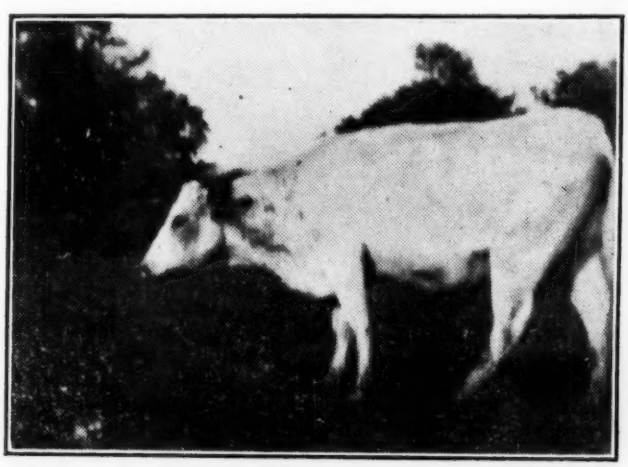

Fig. IV.

"Marigold"—Taken October 13th, 1930.

Early stage of lead poisoning. Note one hind leg thrust forward.

animal. One animal, *Beccles Lass*, paced up and down a meadow with a piece of sugar-beet plant between her lips the greater part of one day; another cow, *Marigold*, stood in a pond of water as far as the stifle joints for several hours with fixed dilated pupils of the eyes, and this animal could not be kept out of the water.

These delirious symptoms gradually gave way to a semi-comatose condition in which we noticed that several of these cows assumed an unnatural position when standing, and they made no attempt to alter that position.

Some of the cows stood with all four limbs drawn together and the back arched; others stood with one hind leg extended forward under the body; others knelt for hours on their knees.

In all cases, emaciation was rapid and marked; eyes sunken within the orbits; the coat was harsh and staring. In some cases we noticed chorea-like movements of the lips and facial muscles, reminding one of post-distemper chorea of the dog.

From my field notes I beg to quote further:—

On October 27th, 1930, the cow *Beauty* breaking up, semi-comatose condition, temperature 101 degrees F.,

Fig. V.

"Anne"—Taken October 18th, 1930.

Arched back. Slight salivation. Recovered on October 20th.

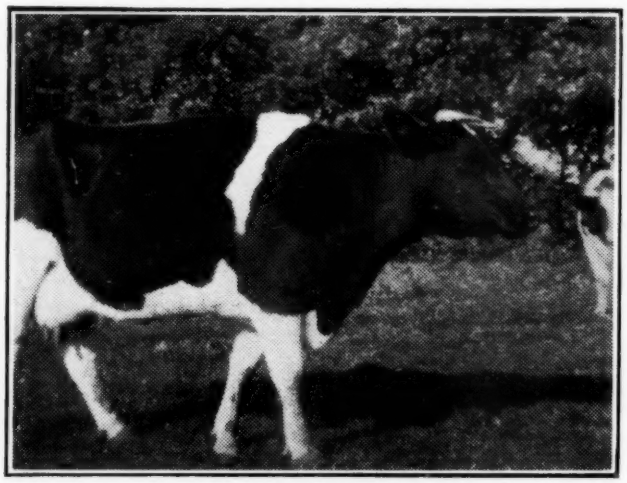

Fig. VI.

"Dimple"—Taken October 18th, 1930.

Eyes sunken within orbits, one hind leg placed forward under body. This cow recovered, but did not return to lactation.

Fig. VII.

"Clove"—Taken November 10th, 1930.

This cow died on March 3rd, 1931.

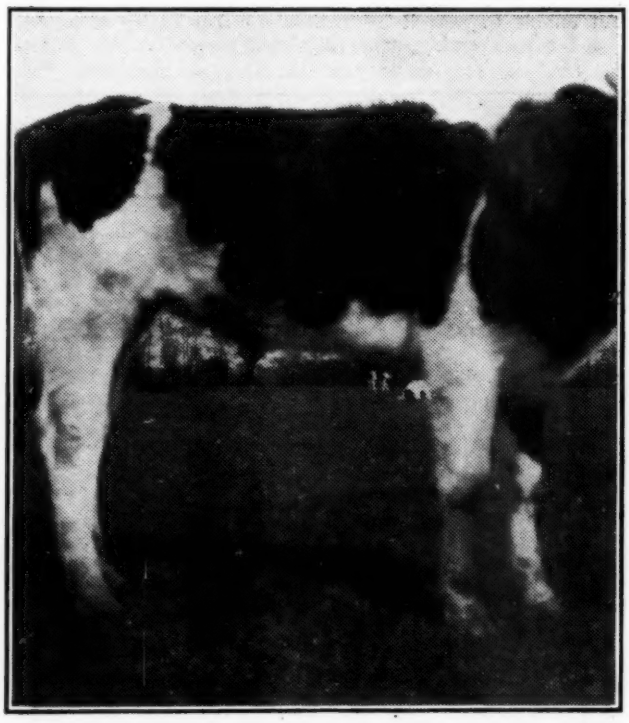

Fig. VIII.

"Elsie"—Taken April 23rd, 1931.

Great emaciation. This cow was taken ill on October 10th, 1930, shortly after calving down with second calf.

continual grinding of the teeth and salivation, emaciation most marked, the animal stands in characteristic attitude; in addition, there is a "nodding" up-and-down movement of the head; these chorea-like movements appear to synchronize with the inspiratory phase of the act of respiration. No blue line present on gums. This cow died the next day, exactly a month after being supplied with the pulp.

November 3rd, 1930.—Cow *Clove*, which was taken ill on September 28th, stands champing her jaws continually, salivation present, emaciation very marked, tongue swollen, œdematous condition of the submaxillary space, twitching of the lips, temperature 101 degrees F.; this cow died on March 3rd, 1931, five months after she was taken ill. No blue line was ever present on the gums.

The stock bull, age 2 years and 6 months, ate some of the pulp which had been cleared out of the cows' mangers; he did not show any acute or sub-acute symptoms of lead poisoning, but the lead affected the muscles of his hind-quarters only; owing to atrophy of the muscles, possibly due to some alteration in the motor tracts of the nerves supplying his quarters and haunches, he was unable to serve the other cows.

To quote Colonel Joshua Nunn, I may say (according to his text book on Veterinary Toxicology, p. 63) "in cattle the various complications are almost invariably seen."

I have here a few snapshots which I took of the affected animals; owing to the bad daylight some of the prints are not so good as one might have wished, but I venture to think some of the photographs depict, in a more or less degree, a picture of some of the objective symptoms exhibited by cows suffering from plumbism.

Since penning these few notes, I took some more photographs on April 23rd, 1931. These prints show a marked emaciated condition of the animals, but no blue line is visible on any of the gums.

Both these cows were suffering from acute lead poisoning on October 10th last, that is more than six months ago.

Bibliography.—" Veterinary Toxicology.—Dr. Lander. " Veterinary Toxicology."—Col. Joshua Nunn.

Discussion.

The President (Capt. G. Dunlop Martin) observed that he was sure they would all agree with him that they had listened to a most interesting paper from Mr. Roberts, and they were greatly indebted to him for the very painstaking manner in which he had recorded the outlook generally. (Hear, hear.)

He had not had anything to do with cows for such a long time that he was afraid he was not in a position to contribute to the discussion, or to criticise, but he had no doubt that they would have have some very interesting matter given them by Mr. Clough, who had kindly consented to open the discussion.

Dr. G. W. Clough: Veterinary Toxicology rests on foundations laid during the last hundred years by veterinary practitioners who have made records of careful observations in cases they have encountered in practice. It is of the utmost importance for the extension of this structure that the foundations should be strengthened by the labours of practitioners in whatever part of the world they practise their profession. Mr. Roberts has presented to us a complete picture of the effects of lead on 16 head of cattle out of a herd of 28 milking cows. His account is particularly interesting in that he has followed the histories for a period of six months from the date of the outbreak. It appears that the animals were fed with sugar beet pulp and that 6 recently calved cows became ill within twenty-four hours and died 7, 11, 12, 13, 14 and 18 days after receiving the food. Of the others, 10 exhibited symptoms of illness about 16 days after partaking of the food; one of these died 32 days and another three months after the feeding with this pulp. I should like to ask Mr. Roberts if he has formed any opinion to account for the rapid onset of symptoms in the recently-calved cows compared with the delayed attacks on the other affected animals. Apparently 12 animals showed no signs of illness; can Mr. Roberts give any reason why these animals were not injuriously affected?

Mr. Roberts has told us that the animals had been fed with beet pulp, but has not mentioned any connection between this and the lead found in the cattle. Where did the lead come from? I may be allowed to enlighten you on this matter. Two samples of the beet pulp were submitted for analysis; no lead was detected in one sample, but nearly one ounce of red lead per pound of beet pulp was found in the other sample. Analyses of viscera revealed the presence of 1/20th part of a grain in one ounce of stomach contents of a cow which died on October 3rd; 1/50th grain per ounce in one ounce of viscera of a cow which died on October 8th and 1/90th grain of lead was separated from one ounce of liver of an animal (Beauty) which died on October 28th. It must, of course, be emphasised that sugar beet pulp may be fed without any ill effect and that in the present case the contamination with red lead was quite accidental. I have on some occasions found lead in brewers' grains, but again the noxious material had been introduced quite by accident.

Fröhner has remarked that the increasing annual records of lead poisoning form the richest contributions in the whole field of toxicology. Mr. Roberts' notes will furnish a most useful addition to this chapter of Veterinary Toxicology. Notwithstanding that acute and sub-acute lead poisoning in cattle and other animals has long been recognised and is one of the best established facts in Veterinary Toxicology, it is curious that up to a few years ago there were comparatively few experimental observations with regard to the lethal doses of lead and its common compounds on different species of domestic animals. This gap in our knowledge has now been partly filled by the results of an important investigation made by Professor Miessner of the Institute of Hygiene in the Hanover Veterinary School (*Deutsch. Tierarz-Woch.*, 1927, 297). This research was undertaken chiefly because of the heavy losses amongst animals fed on sugar beet leaves grown in certain lead-producing districts in Germany, and was made possible by a grant from the German Ministry of Agriculture. In cases of lead poisoning amongst animals near lead mines and smelting works, the question has frequently arisen: " Is it possible that harmful amounts of lead may be absorbed from the contaminated soil by grass and other growing plants?" Although Hevesy of Copenhagen (*Biochemical Journal*, 1923, 17, 439) has demonstrated by an elegant method that small quantities of lead are absorbed by the roots of plants immersed in solutions of lead salts, the amounts taken up by the plants appear to be insignificant from a toxicological standpoint. The damage is undoubtedly due to flue dust from the smelting

operations or to contaminated earth adhering mechanically to the plants. The chief compounds encountered in the lead-mining industry are galena (PbS), litharge (PbO) and lead sulphate ($PbSO_4$), whilst plumbers' materials and paint consist of red lead (Pb_3O_4) and white lead (basic lead carbonate); the principal medicinal preparation is lead acetate.

The lethal doses of lead acetate are stated by Kaufmann to be 50 to 100 grams (2 to 4 ounces) for the cow, and 500 to 700 grams (20 to 25 ounces) for the horse.

Metallic Lead.—Miessner found that two hens which received 24 grams and 130 grams of chemically pure lead over a period of 14 days died 28 days and one day respectively after the last dose. A goat was fed with about three ounces of metallic lead over a period of 50 days, and a bullock with the same amount for 15 days, but they increased in weight during the feeding and manifested no signs of illness. Inasmuch as it was recorded in the *Veterinarian* (1865) that the period intervening between ingestion of bullet splashes and illness of cattle amounted in some cases to as much as 58 weeks, it would be of interest to know the length of time that the experimental goat and bullock were kept under observation. In connexion with the well-known susceptibility of birds to metallic lead poisoning, I may refer to a mysterious disease which in 1921 killed thousands of water fowl in Louisiana. This disease was finally diagnosed as lead poisoning, caused by the swallowing of spent shot in areas frequented by sportsmen. During the winters of 1928 and 1929 there was a recurrence of mortality from this cause. It appears that shallow-feeding ducks puddle in mud bottoms which have been plentifully sprayed with scattered pellets by shore-shooters. It is stated that there is still deposited in the shallow waters of Louisiana and other states lead shot which will continue to kill water fowl for many years, and that there is no possibility of employing remedial measures (*California Fish and Game*, 1930, *16*, 257).

Litharge.—Miessner records that a total dose of 25 grams of litharge caused the death of a hen 6 days after dosage. A goat which received 45 grams of litharge over four days died 30 days afterwards. A two-year-old bull was fed with 85 grams of litharge in two days; 24 hours afterwards the animal lost appetite and suffered from diarrhœa. The pulse, respiration and temperature were normal. On the following day the symptoms exhibited were constipation, dilation of pupils and colicky pains. As death seemed imminent, the animal was slaughtered. A calf, after receiving 60 grams of litharge in 3 days, exhibited acute symptoms of illness (loss of appetite, constipation) and died 3 days afterwards. In a very interesting paper entitled "Contributions to the Toxicology of Lead and its Compounds" (*Archiv. der Pharmazie*, 1926, *264*. 712), Danckwortt and Ude, of the Chemical Institute in the Hanover Veterinary School, describe some experimental observations on the effects of litharge on dogs. One dog died after receiving 16 grams of litharge during 37 days; a young dog died after being dosed with 12 grams, whilst a third was given 15 grams in 15 days, but recovered after cessation of the experiment. The symptoms exhibited by the experimental dogs were apathy, no response to call, refusal of food, attacks of frenzy which recurred especially when the animals were exposed to the sun, frothing at the mouth, howling and ultimate collapse. *Post-mortem* examinations revealed gastro-enteritis. Lead was detected in all the organs of the third dog, but only in the brain and liver of the two others. Veterinary surgeons frequently forward stomach contents only of dogs for analysis; the failure to detect a poison in such a specimen is evidently not a proof that some form of poisoning caused death. On the other hand, in a recent case, I separated 6 ounces of white lead from a dog's stomach! This dog had consumed a quantity of white lead; there was vomition, ulceration of the mouth (which emitted an evil odour) and before death the fæces were black. The animal was carefully nursed, but died one week after consuming the lead. *Post-mortem* examination revealed no marked inflammation of stomach or intestines.

Lead Sulphide.—Galena appeared to have no appreciable effect on hens or ducks. A bullock received 100 grams without observable ill effect, but a young calf which was fed with 150 grams of the compound over a period of 5 days declined in weight, lost appetite, sufferred from an offensive diarrhœa and died 7 days later (Miessner).

Lead Sulphate.—This salt is sparingly soluble in water (1 in 12,000), more so in 5 per cent. saline (1 in 1,000) or 1 per cent. hydrochloric acid (1 in 600), but less so in aqueous solutions of sodium sulphate. Miessner made one feeding experiment on a hen and one on a goat, but no injurious effect was noted. Evidently owing to its slow and sparing solubility in gastric fluids, it is much less toxic than litharge, red lead or white lead. I may here mention that the chief lead compound emitted from the flues of smelting works appears to be lead sulphate. In a case investigated near a lead mine in this country, lead (as sulphate) was found on the grass to the exent of 25 parts per million. Minute traces of lead were found in the organs of an animal that had died after grazing on the grass, but the symptoms were not those of lead poisoning. The conclusion was therefore drawn that the ingestion of the lead was not the cause of death.

Lead arsenate is a deadly poison. Mackintosh, a practitioner in an orchard district, has shown that the losses of horses which had been previously ascribed to influenza or forage poisoning, were in reality due to lead arsenate poisoning. This author states that in his district more horses are lost from the practice of grazing them in orchards during autumn and winter than from any other form of lead poisoning (*Journ. Amer. Vet. Med. Ass.*, 1929, *74*, 193).

Antidotes which have been employed in treatment of lead poisoning in animals include sodium sulphate, potassium iodide, sodium phosphate and flowers of

sulphur, the object of using these substances being to convert the lead into insoluble compounds. Danckwortt and Ude have investigated the effects of various therapeutic agents on dogs which had been given known amounts of litharge. They observed that in some cases intravenous injections of sodium sulphate led to improvement, but that this substance was not a sure remedy. The results with potassium iodide were similar. Colloidal silica had no effect, but colloidal sulphur given intravenously yielded the best results. The good results which have attended the administration of sodium thiosulphate intravenously in cases of arsenical and mercurial poisoning, suggest that this treatment might be investigated in cases of lead poisoning. It would be of interest to know what treatment was adopted in the cases described by Mr. Roberts, and if he is of opinion that it was of any benefit.

In one of Miessner's experiments a hen died 2 days after feeding with only 9 grams of litharge; Miessner attributed the more rapid death after a smaller dose of lead in this case to the fact that the bird revealed, on *post-mortem* examination, extensive tuberculosis of the intestine. It thus appears that an amount of a poison less than the commonly accepted lethal dose may produce death in an animal already affected with tuberculosis. The question sometimes arises in medico-legal work: "Is it possible that a certain poisonous substance which has been received by an animal in amounts too small to produce death or symptoms of poisoning may lower the resistance of the animal to the bacilli of tubercle, Johnë or contagious abortion?" There appears to be little reliable evidence in support of a positive or negative answer to this question. Lorigu in 1912 described experiments he had made on the effects of lead nitrate and lead sulphate on guinea-pigs he had infected with tuberculosis. He concluded that plumbism creates a predisposition to tuberculosis, but in my opinion his experimental results do not warrant such a conclusion. It has frequently been stated that chronic arsenical poisoning causes a predisposition to tuberculosis in animals. The evidence for this is based on observations on animals in the neighbourhood of arsenical smelting works, but from these works large quantities of sulphurous acid fumes are emitted and the effect of the irritant vapours may be much more important than that of arsenic. Lungs may suffer injury and thus render the animals more liable to attack from tubercle bacilli. The influence of atmospheric pollution in certain towns on the incidence of tuberculosis has frequently been discussed in human medicine.

During the last few years a considerable amount of work has been performed from the chemical aspect with regard to the detection of small quantities of lead in organs and in urine. The paper of Danckwortt and Ude is of importance in this connection, whilst new methods of detecting minute amounts of lead in urine have been devised by chemists working in conjunction with the Departmental Committee on Ethyl Petrol. The Committee found that minute quantities of lead were present in the urine of almost every subject examined, and that persons living in towns excrete more than persons living in rural districts. Time does not allow of my saying more about the interesting report of this Committee except that the experiments on the absorption of lead from ethyl petrol were made on rabbits, which animals are amongst the least susceptible to lead poisoning.

I should like to say, in conclusion, that in this age of specialisation I do not think it is necessary for students to be taught all the chemical tests for poisonous substances. It is much more important that some instruction be given on the selection of specimens to be submitted for chemical analysis and on the amounts of such specimens which should be forwarded for an analysis for poisons.

Professor G. H. Wooldridge described himself as being overwhelmed by the volume of facts which had been put before them in Mr. Roberts' account of his cases, and by their elaboration by Dr. Clough: he had really not had time to collect his thoughts in a manner which would enable him to enter into any serviceable discussion of the subject, but there were one or two points he should like to raise.

One was with regard to the differences in the effects produced in the cattle by the lead: how some cattle escaped, while others were more seriously affected—whether Mr. Roberts put that down to any difference in susceptibility in the cattle or to variation in the amounts of lead amongst the different samples of beet pulp.

One would like to know, too, what was the source of the lead in those cases, because beet pulp was an acknowledged reliable food for dairy cattle, and if that lead gained entrance to it in the ordinary course of manipulation instead of from an accidental source, one would hesitate to recommend its general use.

Another point that occurred to him was to ask whether there was anything in the beet pulp that increased the solubility of the lead and so increased the absorption and the toxic effects. Dr. Clough showed that certain lead salts were very soluble in acids; consequently, they were more likely to be absorbed in solution in hydrochloric acid, which was one of the regular constituents of the gastric juice: one could thus realise how it was that the salts of lead (which might not usually be osmotic) might be absorbed under such circumstances and become a source of trouble.

The difference in the time at which symptoms were produced was a very remarkable thing, because he took it that immediately the beet pulp was suspected of being the source of the lead its further administration was stopped, and if that were so it was an interesting thing that a number of the animals showed no symptoms until several weeks afterwards.

One was struck with the absence of what had usually been regarded as one of the cardinal symptoms of lead poisoning—the bluish line round the gums. That gave confirmation to a view he had held for a long time, that it could not be regarded as an essential in cases of lead poisoning.

No reference was made by Dr. Clough to the susceptibility of young dogs and toy dogs to the inhalation of lead paint. At the College they met with a number of such cases, in which one could take it that there had been no actual ingestion of lead.

He was struck very much by the small proportion of lead that was found in the contents of the rumen, on the analysis of these cases. In several instances it was one-fiftieth of a grain per ounce of the contents of the rumen. Assuming that the rumen would hold 100 lbs. or so, that worked out at only 30 grains of lead in the whole rumen contents. The amount that remained in the rumen was not the lead that had done the damage, but the total quantity was very small compared with the massive amount given in the experiments quoted by Dr. Clough, and one

would like to have some explanation of that enormous disparity. That was one reason why he asked if there was anything in the beet pulp which had increased the solubility of the red lead and was in part responsible for the trouble.

In regard to antidotal treatment, he had usually resorted to sulphate of magnesia (rather than to sulphate of soda) and to considerable quantities of egg albumen. He would like to know whether the albuminate of lead so formed would be more easily absorbed or not by reason of the administration of Epsom salts. In the case of chronic plumbism potassium iodide had always been recommended, but he must confess that he had no actual experience of beneficial results from its use. However, he did not know of anything better, unless it was, as had been suggested, the intravenous injection of some of those preparations. Dr. Clough had told them that some of the sulphides might be more valuable.

He wished to thank both Mr. Roberts and Dr. Clough for their most interesting contribution: they were such as the Fellows would put aside for future reference when they received publication in the *Veterinary Record,* for they were of very great value. (Applause.)

Major R. C. Tennant said that in February, 1920, he was called in to see a herd of 24 dairy cows, which had gone off their feed, were short in milking, and appeared to be very dull. There was no pronounced diarrhœa, but the animals were hide-bound and were fetching up against the manger and bellowing. Two died two days afterwards and three four days afterwards. *Post-mortem* showed no marked symptoms of gastritis or enteritis, and he suspected poisoning.

Professor Macqueen came down, and expressed the opinion that the cases were suspicious of lead poisoning. The brewers' grains which the cattle had been receiving were analysed in London by Dr. Lander, who found lead.

Out of 24 animals, 20 died within three weeks. Three recovered and it was thought that a heifer in the yard had recovered also, but they never did any good: they remained hide-bound and never came back to condition. In the result, therefore, the outbreak wiped out the whole of that man's herd, and it became a question of trying to get compensation. Unfortunately, the number of the truck which had carried the grains was not taken, and the railway company gave no help. The owner's lawyer therefore advised him that no good purpose would be served by proceeding further in the matter. All these cattle (which were blind from the effect of the poison) were treated with large doses of Epsom salts.

Major Tennant quoted two other cases of lead poisoning which had occurred in his practice. In the first of these a heifer showed symptoms after licking fresh paint off the gates: she recovered after the administration of Epsom salts. In the second case, which occurred only a few weeks ago, two Jersey heifer calves—one ten months old and the other six months—were affected out of a bunch of ten which had been turned out in a paddock for four hours. Next morning report was sent in that two of these calves had had a fit. He (Major Tennant) was not at home then, but in the afternoon he went to the farm and found that the smaller one had died, but that the other seemed to be all right, though the breathing was somewhat accelerated. After about ten minutes, however, suddenly she gave a roar and started dashing about the place. A man eventually had to hold her by the tail in the middle of the yard (to prevent her injuring herself) while she continued to spin round. Then she dropped and, after " galloping " for 40 minutes, died.

He made a *post-mortem* examination on that heifer and sent some of the viscera up to Dr. Clough, who found one-sixtieth of a grain of lead per ounce. Where the animals got the lead from they did not know, but possibly some had dropped from the roof on to the floor of the mixing house.

There was no opportunity for treatment in those cases.

Dr. Tom Hare, having expressed his thanks to the reader of the paper and opener of the discussion, said that Dr. Clough had raised the question of the increased susceptibility to tuberculosis, produced by chronic lead poisoning. He (Dr. Clough) had quoted some work that had been done in Vienna. Eighteen months or so ago an investigation was made into the incidence of tuberculosis in workers in lead around London, and, so far as he (Dr. Hare) recollected, the investigators found that there was no increased incidence or susceptibility amongst such workers.

Dr. Clough had emphasised the approved methods of taking samples and sending them to the toxicologist for investigation. He would like to emphasise another very serious omission in their knowledge, namely, the pathology of veterinary toxicology in general. Probably the only part of toxicology of which they could claim to have adequate pathological knowledge was confined to drugs used mainly in surgery, particularly the halogen compounds; probably because so much work had been done for surgical purposes. The pathology of the plant poisons and of many of the industrial poisons, had been dreadfully neglected in this country. Might he offer a suggestion as to how that deficiency might be remedied? He would suggest that whenever veterinary surgeons made their *post-mortems* in suspected cases of poisoning they should submit appropriate tissues not only for chemical analysis, but also for microscopical examination. He would be very interested to have the opportunity of correlating his findings with those of Dr. Clough. What, it might be asked, was the value of studying the morbid anatomy of poisons? If from the detailed microscopic study of the organs the effects of a poison could be ascertained, such knowledge would be of vital importance to the clinician. If they knew the tissues in which the toxic factor was arrested and the channel by which it was excreted, they were half-way towards giving the appropriate treatment and saving the life of the affected animal.

Therefore he appealed to those present to keep his request in mind when studying those cases in future.

Lead was absorbed by embryonic tissue in particular, the site of which, in the adult, was the endometrium of the uterus. That might have an interest for Mr. Roberts, in that two of his cows aborted. It was quite possible that had the placental sites of those cases been investigated Dr. Clough would have found lead in appreciable quantity.

Bone was a second important place in which lead settled, a very difficult tissue to get at for treatment. Some good work was being done in the human subject in treating cases of chronic lead poisoning with parathyroid extract. In such cases the excretion of the lead which had become deposited in the bone, was considerably hastened. This might be kept in mind for further investigation in our own animals.

The excretion of lead invited further study of the pathology of the large colon and of the kidney: and he was anxious to secure those organs in such cases.

Perhaps he might be allowed to suggest to Dr. Clough the perusal of the literature issued by the cancer research workers under Professor Blair Bell, at the University of Liverpool. They had been working on the effects of lead on tissues for ten or twelve years.

Mr. W. Perryman said that he had never had a case of lead poisoning, but he would like to comment on Mr. Roberts' paper because he thought it most graphically and lucidly set before them a set of cases that undoubtedly, with the aid of Dr. Clough, were proved to be cases of lead poisoning.

Mr. Roberts—very wisely, as he thought—gave no account of the manner in which he presumed the lead got into the animals through the food. He (Mr. Perryman) hoped he did not consider it was to do with the beet pulp, because he had always understood it was a good feeding property, free from any salt (except perhaps lime salts) and certainly not containing any salts of lead. Therefore, perhaps Mr. Roberts would give them some idea as to whether he came to any conclusion as to how the poisoning of those animals took place. He would ask him, did he go into the water supply? The late Professor Tewson impressed upon them that a water supply carried through new lead pipes had a very detrimental effect: he suggested that in the new pipes lead was readily

absorbed, by reason of the carbonic acid in the soft water, and certainly it should not be stored in newly-made tanks of lead.

He should like to say that he did have some experience years ago in connection with an accidental lead poisoning case that came into the courts, and which showed that one could not be too careful in the observation of details. His clients, the biggest manure people in London, were requested by a farmer to send a load of clean straw for bedding young cattle in the farm-yard. The farmer subsequently had several cases of lead poisoning, which he attributed to the use of that straw. His clients sought to prove that they had sent the best stuff, which could not have been contaminated, but the plaintiffs proved that it had been and his clients lost the case—and he believed rightly, because in the straw painters had thrown a lot of their rags. The animals went for those rags and they were poisoned, the poisoning taking place in the farm-yard.

Although they had had a learned discussion on the scientific aspect of that question, it was one which came home to the general practitioner, and it would be a very happy ending if it could be said how those cases arose.

Mr. H. E. Bywater observed that Dr. Clough had mentioned the necessity for recording cases in toxicology, and that was emphasised when one remembered the evidence given by a learned toxicologist, Professor Dixon, of Cambridge, in a case of acute lead poisoning in cattle.

He had risen to record such a case. A builder had a yearling heifer which, one day, he thought he would like to run out into his yard. The animal made a hearty meal from a keg of white lead, and within 12 hours it died in convulsions, having exhibited symptoms of colic.

One was rather intrigued by the suggestion of lead poisoning aggravating tuberculosis. There had been a certain amount of work done recently on the administration of minute quantities of heavy metals in colloidal form and by their use the bactericidal powers of the body were increased. One wondered whether, if an animal took in minute amounts of lead, it might not be an advantage rather than a disadvantage.

Professor J. G. Wright congratulated Mr. Roberts upon the splendid manner in which he had described that outbreak of lead poisoning: he thought the record of the clinical aspect he had given was perhaps the best they would find in English literature on the symptoms of lead poisoning. (Applause.) The only thing, to his mind, that was missing was that they were not able to form any opinion as to the dose of lead that those animals consumed. Dr. Clough had told them that in one sample red lead was present in the proportion of one ounce to one pound. If one assumed that some of the animals received 4-lb. of beet pulp, the conclusion was that they had four ounces of red lead. The incidence of the more acute symptoms in recently calved cows was probably due to the fact that, in view of their milk yield, they received more beet. Dr. Clough had shown them the varying degrees of solubility of red lead compounds, and that red lead was rendered more soluble in hydrochloric acid, but the point to be borne in mind was that the lead probably went into the rumen, where there was no hydrochloric acid. The rumen, however, was the seat of cellulose digestion in cattle, and in it a great amount of acid fermentation occurred, and one wondered if it was not, after all, in the rumen that the lead was rendered soluble, due to the presence of organic acid such as butyric, lactic, etc. Dr. Clough had related the case of the dog which died a week after ingestion of lead, in the stomach of which he found six ounces of lead at *post-mortem*. One assumed that there was plenty of hydrochloric present at certain periods of digestion. It was safe to assume that Mr. Roberts and his colleague, as soon as they realised what they were dealing with, administered all the known common antidotes, but from the history given by him it appeared that these had little or no effect in eliminating the lead which had accumulated in the tissues. One wondered how much those later deaths were due to the lead or to the destruction of the internal organs, and particularly the liver, in which the lead had become deposited.

Professor Wooldridge had mentioned that the administration of egg albumen might serve as an antidotal measure—that the lead albuminate thus formed might be a less absorbable material than the ordinary salts of lead. It was customary for the toxicologist to say that the heavier metals were all absorbed as albuminates.

Professor Wooldridge, commenting upon Professor Wright's final observation, said that he thought that in those instances in which lead was absorbed as the albuminate, the albumen had been derived in many cases actually from the cells of the lining of the alimentary tract, and that in many such cases death had been due, not to lead absorption, but to the gastro-enteritis set up by the action between the lead salt and those cells and the liberation of the acid radicle.

The Replies.

Mr. H. L. Roberts, replying to the points raised in the discussion, said that he must thank the Fellows very cordially for the attentive consideration which they had given to his clinical notes; especially did he wish to thank Dr. Clough for his kindness in coming forward and elaborating what they might term the more strictly chemical side of the subject of lead poisoning in cattle, other animals, and poultry.

In the first place, he should like to say that he was called in, not by the owner, but by the factory; consequently he did not treat any of those animals, but he was in full sympathy and co-operation with the owner's veterinary surgeon and the latter told him that he had tried all the drugs which had been mentioned that evening, with the result that he saw for himself.

His instructions were to watch the case and to consult with Mr. Browning, and to go as often as he thought fit and report to the factory offices. He had notified the commercial manager in regard to the reading of that paper, and he felt that he ought to emphasise the source of the lead, because he should not like it to go forth that lead was an ordinary constituent of dried beet pulp. As recently as last Monday evening the commercial manager went so far as to suggest that he should not read the paper, because the general manager of that particular group of beet sugar factories was afraid it might do harm to the industry: he (Mr. Roberts) rather wished he was present that night, as he would have been thoroughly reassured on that point.

The red oxide of lead was introduced quite by accident. The facts were that at the beginning of the sugar beet boiling season the first brew went into a large vat. This vat had been reconditioned and some of the packing of red lead and scales of iron went into two thousand bags of pulp. They were working day and night when the season commenced at the end of September but fortunately only 30 bags were released. He wanted to put quite plainly and in fairness to his clients the fact that that lead was introduced quite by accident, but it had taught a lesson to that group of companies which they would not forget whenever they came to recondition their boilers and tubes.

That, then, was the source of the lead.

In reply to Mr. Perryman, with regard to the water, they did examine it. He submitted a sample of water locally to an analytical chemist who returned a negative report; he also traced the means of conveyance of the water—it was not carried in lead pipes but by means of galvanised iron pipes into galvanised iron tanks.

With reference to the number of cows, there were 17 altogether that were noticed to be very seriously ill. On October 5th this owner was just beginning his winter contract for milk supply, consequently he had 20 of his cows calving within a few days. He wired for this pulp to the factory because he wanted to commence steaming up and thus those freshly calved cows had a greater proportion of pulp than those which were drying off. A stop was put to the use of the pulp on the day of his first visit, *i.e.*, on October 8th. By that time Mr. Browning had made a *post-mortem* on two dead animals

and there were two more dying: that accounted for the apparent discrepancy in the figures and for his not finding them all ill—further, it was a question of quantity; some did not have much, those which had the larger quantity were in the puerperal state. If that suggestion of Dr. Hare's was sound, that might account for the sudden attacks and sudden deaths in those cows which had recently calved or were just about to calve. With regard to some of the others, some of them did not show any symptoms at all, these being those that were nearly dry; moreover, one had to bear in mind what Dr. Clough had told them, that in examining samples of pulp one sample was *nil*, but, on the other hand, the other sample had a very heavy dose of lead in it.

He must thank them all for the very cordial reception they had given to his notes. The subject was an interesting one, but, at the same time, not being the owner's veterinary surgeon, perhaps he did not have as many opportunities of going into things as he would have liked. He would say, however, that there were cows there still suffering from chronic plumbism, and if Dr. Hare would like a clean piece of liver for microscopic examination he would get into touch with the owner and try to let him have it in order that their knowledge of plumbism in dairy cattle might be extended, as suggested by Dr. Hare.

Dr. G. W. Clough, replying, at the invitation of the President, to the queries which had arisen from his opening of the discussion, observed at the outset that the holder of the Chair was to be congratulated on the programme of papers that had been presented during his term of office, inasmuch as they had covered a great many different types of work in veterinary science. (Applause).

Professor Wooldridge had asked if the solubility of red lead might be increased by the presence of the beet pulp. He did not think so, but, strictly speaking, that would require an investigation, to see how far the juice of the beet pulp did attack such a substance as red lead. Professor Wooldridge also referred to the inhalation of lead paint by young dogs: that was rather a wide subject, because the question had been discussed for a very long time by chemists as to whether or no emanation from paint did really contain lead, and he thought the consensus of opinion was that it did not, but that the emanations from the paint consisted of vapours of turpentine, aldehydes, and possibly a small amount of carbon monoxide. Therefore, unless Professor Wooldridge could assure them that the symptoms exhibited by those dogs were really symptoms of lead poisoning he would not be prepared to say that those young dogs did prove more susceptible to lead in those cases, although young dogs would be more susceptible than older animals to most poisons.

Then Professor Wooldridge referred to the quantities of lead separated compared with the amounts received. The only way of solving that question would be by an experimental investigations—feeding an animal with such a substance as red lead, slaughtering it a certain time afterwards and determining the quantities of lead from each of the stomachs, the liver and so on. The quantity found in the first case was one-twentieth of a grain per ounce, and so, assuming with Professor Wooldridge, a hundred pounds as the contents of the rumen, that would give them a quantity of eighty grains, which was decidedly more than that found in the second case, in which one-fiftieth of a grain per ounce was found, which corresponded with an amount of about thirty-three grains. There was thus more in the rumen of the first case than in that of the second and that quantity simply represented unabsorbed poison—the portion that could not possibly have produced death. Also in that connection the red lead in those specimens was in the form of hard pieces, and it appeared to him quite possible that a large portion of it might have got held up in the reticulum, from which he had no contents sent him.

Concerning white of an egg as an antidote, the albuminate of lead would certainly be formed, and he thought Professor Wooldridge was right in assuming that it would be absorbed, if at all, only very slowly. It appeared, therefore, to be sound practice to give white of egg as an antidote. He thought that when industrial workers suffered from chronic forms of mineral poisoning they were often given large quantities of milk, which contained casein; possibly the action might be similar in those cases.

They must thank Mr. Bywater for bringing forward his example, because it was only by such observations that they were able to complete their account of the toxicology of lead. It was most interesting that in that case they had a definite time between the ingestion of the poison and ultimate death: he thought that Mr. Bywater's case approached the record in that respect, in being only twelve hours.

The National Horse Association.

Horse Transport in London.

At the June meeting of the Council of this Association the conditions of the award of Gold and Silver Medals, and Merit Certificates were reviewed, and it was laid down that each case should be considered on its own merits, and that recognition should only be made when great gallantry had been exhibited in saving or attempting to save the life of horses and ponies. The Council hoped that the police, the press and the general public would assist in bringing deserving cases to their notice.

The President reported that a deputation arranged and headed by the National Horse Association, and including numerous organisations interested in horse transport in London, had recently been received by the London and Home Counties Traffic Advisory Committee, with regard to the proposed Oxford Street Draft Regulations, and had protested most strongly against the regulations affecting horse-drawn traffic.

The Council, in considering the representations, expressed the hope that the representations submitted would be carefully considered by the Minister of Transport, as they felt that the restrictions would specially hit the small trader with poor financial resources, and would establish a precedent very dangerous to horse interests. It has been proved and admitted by the Minister of Transport himself that horse transport was the most economical form of transport under certain conditions, and it was essential that the right of using the most economical form of transport should be available to all organisations in the interests of trade and industry.

Representatives of trades connected with the maintenance of horse transport commented upon the detrimental effect upon those engaged in such old-established trades as blacksmiths, saddlers, forage merchants, etc., who would be directly penalised. Restrictions would also affect the farmer who breeds horses, consequent upon inability to dispose of young stock, and would doubtless lead to the dismissal of many transport employees, and those engaged in supplying the demands of those firms who use horses.

A report was received from Mr. C. G. Argles—Chairman of the Slippery Roads Committee—indicating that he, with other members had inspected road surfaces in Essex, Dumfries-shire, Oxfordshire, Wiltshire, Gloucestershire, Somerset and South Devon. They had received courteous consideration and assistance from all surveyors visited, and reported considerable improvement in the many districts visited.

It was recommended that the Publicity Committee should draft, for issue in 1932, a booklet giving revised statistical figures on horse transport, a list of principal shows, race meetings, etc., and an account of what the Association is doing.

Under the London Passenger Transport Bill, the Minister of Transport seeks to amend the constitution of the London and Home Counties Traffic Advisory Committee, and the Council expressed the hope that during such reconstitution the Minister would nominate one if not more members to represent horse transport, and nothing but horse transport.

It is a little ironical that we should be exporting our best animals to improve herds abroad while we are willing to use any rubbish for cross-breeding at home.—*Week-End Review.*

A Reply to some Questions raised regarding Sterility, etc.

By
J. F. D. Tutt, M.R.C.V.S., Winchester.

In order to dispense with the necessity of replying at length individually to various enquiries received from practitioners regarding communications sent by me to the correspondence columns of the *Veterinary Record*, I propose to deal, in the following article, with the principal questions raised. I intend to contribute a fuller communication when the exigencies of general practice permit.

(1) By so-called " shy breeding " I mean families which give only a low percentage increase in spite of the fact that there is no clinical or *post-mortem* change in the genitalia; in other words, an hereditary infertility.

(2) Endometritis does occur in heifers, even in virgin heifers. The diagnosis of endometritis should not be made when the animal is in œstrus, or the normal engorgement may be mistaken for endometritis. This fact is often overlooked.

(3) There is a great risk in the vaccination of milking herds with living abortion vaccine which must not be overlooked, not only from the standpoint of sterility, but also the danger to human beings.

(4) For real functional sterility with upset of the œstral rhythm, Contramine is of value, and also two other preparations which are highly recommended by Quinlan, namely, " Fontanon " and " Viriline," with a suitable ration.

(5) I do not consider that tuberculosis influences œstrus until the ovary is involved, when it may cause cystic degeneration of the Graafian follicle, resulting in nymphomania. Quinlan does not consider that occlusion of the tubes inhibits œstrus unless the ovary is affected. I am in agreement with other workers that the hypophysis, in conjunction with the ovary itself, is concerned in the regulation of the œstral rhythm. An upset in the ovarian hormones may, however, influence the regulating mechanism of the hypophysis. One finds nymphomania so frequently in the absence of tuberculosis, that there is little doubt that it is only one of the causes of the ovarian changes which result in nymphomania. Some time back, my attention was drawn to a statement made by Dr. Frei at the recent congress to the effect that cows with nymphomania might have an ovo-testis, and that the symptoms were induced by a male hormone replacing the female one. I referred this statement to Dr. Quinlan, whom I regard as the authority on the subject to-day, and he disagrees entirely with the suggestion, having carried out histological examination of the ovaries in such cows.

(6) I cannot agree with those who state that endometritis chronica catarrhalis is a result of sterility and not an actual early causative disease. May I ask if they have made, or had made, a microscopic examination of sections at various stages during sterility to prove that this hypothesis is correct?

(7) With regard to Ca. deficiency, Dr. Frei has kindly forwarded me the following details regarding blood calcium found by Emmerson in his laboratory :—

Œstrus: Minimum, 9·08; Maximum, 11·28. Average, 10·23. Interœstrus: Minimum, 8·2; Maximum, 11·92. Average, 10·17.

Cystic ovaries, young cows: Minimum, 9·8. Maximum, 12·51. Average, 10·71.

Cystic ovaries, somewhat older cows: Minimum, 9·63. Maximum, 12·91. Average, 10·95.

The figures mean milligrams per 100 grams blood serum.

Frei adds that in nymphomania, as in œstrus, the blood calcium is increased, but he is not convinced that this is the real cause of nymphomania. He thinks that it is a sequel of disturbance in the vegetative nervous system caused by the alteration of the ovaries, or perhaps in the anterior pituitary, and he is at present working out a publication on this matter.

(8) Colloidal magnesium hydroxide is injected into the uterus direct, exactly in the same way as an ordinary uterine injection, and NOT siphoned out. It acts by converting the peptic process of autolysis into a tryptic one, and it can be repeated daily, or every second day, as occasion permits. In cases of endometritis, or metritis, it can be alternated with Lugol's solution in 3 per cent. strength, if desired, and in some cases this will be found of benefit. Further, its use can be preceded by a flushing out of the uterus with a weak alkaline solution such as sodium carbonate. I do not care for potassium permanganate: if used too strong, it only further irritates the genital tract.

(9) I have not tried stomach pumping in mares that are sterile and which do not respond to the recognised treatment. In view, however, of the success attending colon lavage in the human female in some cases, there may be something in the suggestion, and the process may be worth trying before giving the case up as hopelessly sterile.

Agricultural Research in Scotland.

" The possibilities of science as an aid to greater economy in live-stock production are keenly recognised in Scotland," writes the Agricultural Correspondent of *The Times* in a recent issue. " Farmers themselves have taken no small part in establishing the research centres where several promising lines of work have lately been started. Near Aberdeen there is the Rowett Institute, over which Dr. J. B. Orr presides with great ability. This centre is concerned with elucidating the problems of animal nutrition. Research into genetics and the heredity of desirable characters in farm stock in now in hand under Dr. Crew's guidance in Edinburgh. In a well-equipped building thousands of rats and rabbits are being used for breeding experiments to provide the fundamental knowledge needed as a basis for the better understanding of the breeding problems which concern the farmer. Through the generosity of Mr. Falconer-Wallace, the Animal Diseases Research Association was formed, and now at Moredun, outside Edinburgh, promising work on the various diseases of cattle, sheep, and pigs is being undertaken. Diseases of one kind and another take a heavy toll, and this kind of research is of direct interest to farmers. Then there are the Hannah Research Institute in Ayrshire, and the Macaulay Institute for Soil Research, both of which owe their existence to private benefactors. There is no doubt about the Scots farmer's appreciation of such research. He has no hesitation in laying the problems of his own farm before the experts at these centres."

Of approximately 10,500 veterinarians in active service in the United States nearly 1,400 are employed in the U.S. Bureau of Animal Industry.

Abstracts.

[Pre-natal Infestion of Carnivora with Ascarides. Professor Henry. *Bulletin de L'Académie Vétérinaire de France,* Tome vi—No. 3 Mars, 1931.]

It is no longer to be disputed that there is a possibility of helminths being transmitted from the mother to the fœtus *in utero*. We are in possession of a certain number of observations which demonstrate that for some parasites capable of making active migrations in the organism the placenta does not form an impassable barrier.

In 1922 Schillinger and Cram renewed this experience by approaching conditions of natural infestations; they administered by mouth to a pregnant bitch fertilized eggs of *Belascaris marginata*. Eight days after, the bitch had 12 pups, well developed, but eight were born dead, and the four others died next day. They were found to be infested with larvæ of ascarides—some being in the liver, some in the lung and some in both organs. The larvæ had a length of 900μ. *Post-mortem* on the bitch was made eight days later and a few encysted larvæ were found in the heart and lungs—there were no ascarides in the intestine.

In 1926 Akagi infested six pregnant bitches with fertilized eggs given in the food. The pups produced were carefully examined at birth and on following days. At birth larvæ were numerous in liver and lungs; towards the fifth day the larvæ emigrated by trachea and œsophagus towards the intestine. The parasites are mature in the intestine from the 21st to the 25th day. The bitch herself showed no alterations apart from slight hæmorrhages and connective tissue infiltration.

Finally, in 1927, Augustin undertook similar tests. In one of them a bitch was infested by the digestive tract with fertilized eggs of *Belascaris marginata*. Nine pups were born 33 days afterwards; they were apparently healthy and were destroyed one by one at different ages. The results were as follows: at birth one found, notably in the liver, larvæ measuring 900μ; at 24 hours in the lung larvæ of 1 mm.; at three days the lung still contained larvæ 1 mm. long; on the sixth day 24 ascarides, two-four millimetres long, were present in the intestines.

On the 21st day, 53 young ascarides, 16-26 mm., were collected from small intestine; eggs were found in fæces on the 13th day and on the 35th day the last pup is killed and 60 ascarides were found in the intestine. On *post-mortem* the mother was not found to have any ascarides.

All these experiences are in agreement and show that intra-uterine infestation by embryos of ascarides is easily realised in bitches during gestation. It has long been known that very young dogs can harbour enormous numbers of ascarides—so great, indeed, as to cause intestinal obstruction (a case of this in a thoroughbred foal, was published in the *Record* several years ago—Translator).

Davaine, Mégnin, think that infestation in these cases may come from the presence of eggs on the teats of the mother, and indeed ripe eggs have been demonstrated in this site, but these are few and scattered and would not account for the massive infestation so frequently observed.

It is well to recall the cycle of evolution of ascarides, which is more complex than was thought 15 years ago.

(1) The intestinal parasitism ends in formation of adult ascarides and the laying of eggs.

(2) Incubation of these eggs outside the body ends in the formation of eggs containing embryos.

(3) The re-entry of these fertilized eggs by the mouth; liberation of larvæ in the small intestine, penetration of intestinal wall by larvæ and their migrations in the organism, bringing about secondarily the presence of larvæ in the intestine by the circuit lung—trachea—œsophagus.

The normal evolution supposes the passage of the embryos from the pulmonary circulation into the airways, but some are carried into the general circulation and are found in the muscles, kidneys, etc., where they are destroyed, encysted or eliminated.

In pregnant bitches the embryos readily pass the fœtal membranes, as the following experiences demonstrate.

Fülleborn, in 1921, produced pre-natal infestation by injecting subcutaneously a bitch three days before parturition with millions of larvæ of *Belascaris marginata*, obtained from the liver of a guinea-pig which had ingested fertilized eggs two days before.

In the liver and lung of the pups at birth hundreds of larvæ were found; at two days old, larvæ were in the trachea and œsophagus; at six days the intestine contained young ascarides 4 mm. in length; at 11 days two to three centimetres and at three weeks adult worms were present.

The parasites accumulated in the liver and lung without much difference in size until birth, after which, about the third day, they quit the lung for the intestine where they become adult about the 25th day. The mothers are not affected, or but slightly, and then only if very young.

This experimental demonstration is completed by observations of spontaneous infestations.

In a fox cub dead before it had sucked, Hadley Warwick and Geldow in 1924 found larvæ of *Belascaris* in the lung tissue.

Professor Henry has repeatedly found, in fox cubs born dead, the larvæ of ascaris.

In a litter of three well-developed cubs, dead at birth, the larvæ were found in the lung and trachea. Patience is necessary in searching for the larvæ; small pieces of pulmonary tissue are pressed and the escaping juice examined miscroscopically. The larvæ measure about 1,000μ. In the case quoted above the larvæ were still living and made slow turning movements, although the subjects were two days in the post and a week in the ice box. The pulmonary tissue of the three subjects was marbled by fine hæmorrhages—the only lesions. It must be conceded that decisive proof has been given that in carnivora intra-uterine infestation by ascarides is in no way exceptional. Massive infestation of pups can only be explained by this and prophylaxis should be based on it.

Attention should be drawn to the possible consequences of the invasion of the new-born by the larvæ of ascaris.

In the case reported by Schillenger and Cram eight out of twelve pups were born dead and the others died next day. In Henry's case the litter (three) were born dead. The fœtuses were well developed and showed no accident except larval parasitism. Larval parasitism, then, in carnivora is a non-negligible cause of mortality at birth.

In the discussion evoked by the reading of this paper, M. Mallet quoted a case in which pups removed by Cæsarian section and fed on sterilized milk had, when 20 days old, adult ascarides in their intestines. M. Cocu had observed in a pup three weeks old, separated from its mother at birth

and brought up on boiled milk, ascarides several cm. long.

Professor Henry mentioned that in silver fox breeding, the subjects being very valuable, great care is taken to prevent losses from larval ascariasis. It is in the first period of existence that ascarides are numerous and great numbers of eggs produced. At three weeks of age the silver fox cub gets a capsule of tetrachloride of ethylene, the dose being repeated 15 days later—afterwards once a month for some time: if continued later, this is not for ascarides, but for uncinaria.

W. R. D.

[**A Practical Method of Demonstrating Worm Eggs in Equine Fæces.** Lenziger, E. *Schweiz. Arch. f. Tierhlk.* 1931, No. 2.]

In answer to a claim by Ellenbogen, of Hamburg, that the Fülleborn rapid salt enrichment method was one of the best and superior to the Steck sugar enrichment method, the author here publishes the results of examinations for ascarid eggs made from the fæces of 45 horses, in which both methods were used side by side. In 18 positive cases the Steck method showed, in the majority of them, many more eggs, the cover-glass preparation employed in it showing from as many as to 32 times as many eggs as the Fülleborn single drop method. This method can be performed in little more than 15 minutes, whilst the Steck method requires several hours. Apart from this question of time the author considers that one preparation of Prof. Steck's method is equal in efficiency to at least four preparations of that of Prof. Fülleborn.

J. T. E.

[**The Peptic Ulcer of the Abomasum of Adult Cattle.** Dr. Müller, *Schweiz. Arch. f. Tierhlk.* 1931. Nos. 2 and 3.]

This is a long paper, dealing with all aspects of the condition, including a complete discussion of the accounts and opinions of all who have written on it. Peptic ulcer is much commoner in calves than in adult cattle, but cases in the latter occur from time to time and appear to be relatively frequent in the author's territory.

The condition is defined as "tissue loss with ulceration, occurring as a result of the digestion of damaged mucous membrane with or without deeper layers of the stomach wall by the stomach secretion, the cause of the initial damage being inside and not outside the organ."

The etiology may be divided into five classes: (1) the blood vessel theory. This, in short, refers to the occurrence of local ischæmia, as a result of which necrosis of affected mucous membrane occurs: the mechanism of this action is by no means clear. (2) the neurogenic theory: this postulates cramp of the stomach wall due to nervous influence of undecided origin (central nervous system, Nn. vagi, Nn. sympathetic, Auerbach's plexus, coeliac plexus, coeliac ganglion?) in which the smallest blood vessels are involved. A reflex cramp of the stomach wall may be caused by stimuli emanating from a diseased condition elsewhere. (3) the bio-chemical theory: superacidity and/or supersecretion by the stomach may result in self-digestion of the mucosa: this condition is itself referable to abnormal nerve function. The author considers that the layer of mucus would always protect the stomach from its acid and that this theory is untenable. Two further theories, those of infection and toxin excretion and the theory that trauma is important in the etiology of acute ulcer, are dismissed as being of little, if of any, significance.

According to the author's own observations, peptic ulcer in cattle occurs most frequently in the pyloric region of the abomasum and seldom in the duodenum. The ulcers, which are single or multiple, are round with sharp borders. The defect is nearly completely made up by the healing process and commonly a mere crevice in the mucous coat is all that is left. Clinically two forms occur, that accompanied by hæmorrhage, which may be severe, and that not accompanied by such. The latter has no characteristic syndrome and is evidenced only by indigestion or perhaps by chronic gastro-intestinal catarrh. Hæmorrhagic ulcer is evidenced by a variable degree of internal bleeding, shown as blood-stained fæces with general anæmia. If perforation occurs the symptoms of acute peritonitis follow. Simple hæmorrhagic ulcer is depicted clinically by colic, uneasiness, anorexia, suspended rumination, decreased peristalsis with delayed and lessened defæcation, the fæces being dark with various degrees of change due to the presence of blood, slight tympany, variably pallid visible mucous membranes and cold extremities. The pulse is 100-160 per minute, temperature 36-38° C. Vomition, mentioned by Hutyra and Marek and others, was never observed by Müller. The prognosis should always be guarded. In 10 treated cases out of 12 seen by him, 4 recovered. Treatment should be applied as early as possible after diagnosis has been made. For the purpose of differential diagnosis ordinary colic can be differentiated by the absence of blood in the fæces, intussusception by the total cessation of defæcation (blood does occur here also, but usually to a smaller extent) and rectal examination will probably reveal the invagination; anthrax is easily diagnosed and traumatic indigestion has its more or less typical syndrome.

The principles of treatment include starvation, gastric sedatives (opium) local protection and hæmostasis for the ulcer (liquid paraffin, bismuth, 10 per cent. gelatin, etc.) and, to favour cicatrisation, silver nitrate. The avoidance of overfeeding and the giving of alkali are indicated during convalescence.

The author made histological examinations of abomasal wall containing an ulcer and an account of his findings, together with that of the normal organ, is given. He also had samples of grass and hay from farms, on which cases of ulcer had occurred, analysed particularly as regards the Ca., K. and P. contents, but he found nothing here of much significance.

Points of interest noted in connection with 12 cases of gastric ulcer seen in the course of nine years are: (1) the condition appears to be of local incidence; (2) there appears to be no seasonal connection with the occurrence of ulcer; (3) 83 per cent. of the cases occurred in cattle between three and five years of age and most of these were in cows in advanced pregnancy or newly calved. Various theories to account for the condition are advanced and suggestions for research made. Five figures and a complete bibliographical list are given.

J. T. E.

[**Fertility Studies in the Bull—(I).** Donham, C. R., and Simms, B. T. *Jnl. Amer. Vet. Med. Assoc.*, 1931. 31, 658.]

This paper gives the results of the examination of the genital organs from 201 bulls obtained from the abattoir. After inspection of the organs for gross lesions, fresh preparations were made for the detection of motility of the spermatozoa and representative portions of the organs were sectioned and stained.

In 76 per cent. of the animals definite adhesions were noted in the scrotum, but no correlation between these lesions and the age, size, and general condition of bull, and abnormal conditions of the testicular tissue, could be established. It is suggested that these injuries were the result of mechanical injuries by kicking, etc.

In some cases bacteria were isolated, but these were of various types and no significance was placed upon their presence, while agglutination tests with the sera of 19 bulls showing these lesions were negative to *B. abortus* in 17 instances.

With the exception of these adhesions, the testicles appeared normal to naked eye. Microscopic examination frequently revealed desquamation of the germinal epithelium, but this semed to be unrelated to the motility of the spermatzoa. Great variations were observed in the motility of the spermatozoa. If an individual cell was watched for a considerable length of time it might be found to move vigorously, cease from motion for a while and then begin vigorous movement again. None of the numerous abnormal forms described in the literature were noted in fresh specimens, but it was found that in fixed and stained smears it was extremely easy to cause detachment of the head from the tail. The percentage of such forms was materially increased through excessive manipulation of the cells.

R. E. G.

[**Fertility Studies in the Bull—(II).** Donham, C. R., Simms, B. T., and Shaw, J. N. *Jnl. Amer. Vet. Med. Assoc.*, 1931. 31, 665.]

In this paper, the relation of the bull to the reproduction problem in cattle is considered. Seminal specimens were collected from the vaginas of cows immediately following service and were then submitted to a microscopical examination as soon as possible. Two groups of bulls were examined, the one consisting of animals from field herds and the other including bulls in experimental herds: in general, the observations in both sections were in close agreement. Attempts were made to estimate the percentages of motile spermatozoa by recording them in groups as over or under 90 per cent. motile: those specimens exhibiting 90 per cent. motile spermatazoa or above were considered normal. In the field studies on 101 samples from bulls whose breeding records were not known, 48 per cent. were recorded as having normal motility and 52 per cent. were below normal. In the case of 17 bulls whose breeding records were available, nine had normal sperm cells, and ten abnormal cells. Pregnancy followed five of the nine services in the former group (55 per cent.) and five of 15 services in the latter (32 per cent.). During the breeding season, 75 per cent. of cows mated to the normal bulls became pregnant, while 57 per cent. became pregnant to the abnormal animals.

In the experimental group 120 seminal examinations were made from 14 bulls. Sixty-six were recorded as having normal motility and pregnancy resulted in 53 per cent., while 54 were below normal, producing pregnancy in 24 per cent.

It is pointed out, however, that while there seems to be a definite relation between the seminal picture and the probability of pregnancy, there were such large variations in different samples from any one animal that the practice of classifying a bull as normal or abnormal through the examination of one specimen only should not be adopted. Measurements of spermatozoa and attempts at determining the hydrogen-ion concentration of mixtures of vaginal discharges and semen were unsatisfactory.

R. E. G.

Comparative Values of Irradiated Ergosterol and Cod-liver Oil.

Cod-liver oil prevented or cured rickets in 95 per cent. of the cases treated when given in doses of three teaspoonsful daily (1400 rat units). At the end of the experiments 98 per cent. of the subjects were either well or benefited. A mixture of cod-liver oil plus irradiated ergosterol in a dosage of three teaspoonsful a day (3650 rat units) prevented or cured rickets in 98 per cent. of the cases. There was no evidence of superiority among this group as compared with the group given cod-liver oil alone. Irradiated ergosterol in a daily dosage of 1250 rat units prevented or cured rickets in only 44 per cent. of the cases treated. The results in this group were not significantly better than those for the control group of untreated subjects. Cod-liver oil in a dosage of 1400 rat units of vitamin D per day was much more active as an anti-rachitic agent than was irradiated ergosterol in approximately equivalent rat unit dosage. There is no evidence that rat units of vitamin D in irradiated ergosterol are equivalent to the same number of rat units of vitamin D in cod-liver oil as a curative or prophylactic remedy for rickets. There is no definite evidence of greater incidence of rickets among artificially fed than among breast-fed infants. Coloured infants are more prone to rickets than white children; they are successfully protected by a daily dose of three teaspoonsful of cod-liver oil.—D. J. Barnes, M. J. Brady, and E. M. James (*Amer. J. Dis. Child.*, 1930, **39**, 45; through *Biolog. Abstr.*, 1930, **4**, 2577.—Ex *Pharm. Jour*).

The sheep farming industry of Northern Natal has received a severe set-back through the poisoning of twelve magnificent stud sheep, including two rams valued at two hundred guineas and fifty guineas respectively. The animals collapsed while being taken back to their farm from the Agricultural Show at Vryheid.—*Reuter.*

In a study of sterility in mares, at the Kentucky Agricultural Experiment Station, *Bacterium viscosum equi* was isolated from over 50 per cent. of the foals examined. In searching to obtain evidence of the normal habitat of this organism it was found in the crypts of the tonsillar region of mares.

N.V.M.A. Divisional Reports.

Central Division.

Lead Poisoning discussed at Red Lion Square.

In an earlier section of this issue there is published a communication entitled "A few notes on Lead Poisoning in a herd of dairy Cows," which was made to this Division by Mr. Horace L. Roberts, F.R.C.V.S., of Ipswich, at a meeting held at 10, Red Lion Square, W.C.1, on the evening of Thursday, June 4th, 1931. Mr. Roberts' paper produced a discussion (a report of which also is published elsewhere) that occupied the major portion of the evening and so brought to a most interesting and successful conclusion the series of sessional meetings held at headquarters under the Presidency of Captain G. Dunlop Martin.

There were present, Captain Dunlop Martin (in the Chair), Mr. W. Brown, Mr. H. E. Bywater, Major W. Dennington, Dr. Tom Hare, Mr. D. Johnston, Major Hamilton Kirk, Captain W. J. Leyshon, Mr. G. H. Livesey, Dr. J. McCunn, Mr. J. W. McIntosh, Mr. W. Perryman, Major F. S. Probyn, Mr. H. L. Roberts, Major R. H. Stalker, Mr. A. W. Stableforth, Captain R. J. Stow, Major R. C. Tennant, Mr. G. A. Tomlin, Captain W. K. Townson, Mr. R. A. Willett, Professor G. H. Wooldridge, Professor J. G. Wright and Captain J. F. Macdonald (Hon. Secretary). Messrs. G. V. Short and D. I. C. Tennant were present as visitors.

As the minutes of the May meeting of the Division had not received publication, they were not presented for confirmation.

Correspondence.—(1) From Lieut.-Colonel E. P. Argyle, Mr. G. N. Gould, Junr., Major W. B. Howe, Mr. H. D. Jones, Mr. G. P. Male, Major R. E. Montgomery, Major-General Sir John Moore, Captain S. J. Motton, and Mr. J. W. Pritchard, regretting their inability to attend the meeting. The Hon. Secretary informed the Fellows that, in his letter, Sir John Moore had drawn attention to his booklet "Our Servant the Horse," which he had written and brought out on behalf of the Royal Veterinary College Re-building Fund. The publication dealt with the services rendered by the horse during the Great War and the author had sent along a number of copies in the hope that the Fellows would distribute them amongst clients likely to subscribe to the Fund. By the issue of this booklet it was hoped to raise the sum of £1,000.

Mr. McIntosh warmly commended the work, and expressed the hope that every Fellow would take copies and make good use of them.

(*a*) From the General Secretary of the N.V.M.A., acknowledging the Division's reply to a letter from him (dealt with at the last meeting) concerning the undesirable use of additions to letters indicating professional or academic qualifications.

The late Mr. H. J. Dawes.—The President now rose to say that it was only fitting, before proceeding to the next business (election of representatives to Council, N.V.M.A.), that he should make some reference at that meeting to the death of that very well-known member of the profession, and Hon. Secretary of the "National" Association, Mr. H. J. Dawes. He thought that most of them were aware of a good deal of the work done by the late Mr. Dawes, but very few knew what a vast amount of energy and time he actually devoted to that work.

All were very deeply indebted to him for the great efforts he put forward on behalf of the present Association, and he thought they might very well ask their Secretary to take official notice of the fact of Mr. Dawes' death by sending both a letter to the Council of the N.V.M.A. and one to Mrs. Dawes expressing sympathy and their sense of loss. He moved accordingly.

The motion was carried *sub silentio*, the Fellows upstanding.

Election of Representatives to Council, N.V.M.A.—The Hon. Secretary informed the meeting that, following upon the recent alteration in the basis of divisional representation to Council, N.V.M.A., the Society was now entitled to seven representatives.

Nine nominations were made, and, after a ballot, the following were declared elected: Principal F. Hobday, Major H. Kirk, Professor James Macqueen, Professor James McCunn, Captain W. K. Townson, Mr. R. A. Willett and Professor J. G. Wright.

Professor James Macqueen.—The meeting heard with relief, and greeted with applause, the President's report that Professor James Macqueen was progressing very favourably and was likely to leave hospital at the end of the week.

Next Meeting.—The President observed that he had discussed with the Hon. Secretary the matter of their summer meeting and he would be very pleased if they would come to see him at Shenfield on that occasion—there would be a garden party in place of the usual business meeting. He hoped they would all come, and bring their ladies with them.

The President's invitation was accepted with gratitude, on the proposition of Mr. Roberts, seconded by Captain Stow, Wednesday, July 8th, being determined upon as the date. As the Royal Sanitary Institute Congress is being held at Glasgow during that week Mr. Bywater undertook to take the place of the President as the Society's delegate.

Paper.—The President now called upon Mr. Roberts to present his paper, which was heard and discussed with the greatest avidity. At the conclusion of Mr. Roberts' reply, the President said that he should like, on their behalf, to propose a very hearty vote of thanks to Mr. Roberts for kindly coming forward and giving them that most interesting paper. He regarded it not only as a very practical paper, but as one of very great value and importance to practising veterinarians in country districts. They had, too, to thank Dr. Clough for so kindly elaborating the subject on the more technical clinical side. He was sure that he was only voicing their wishes in proposing a very hearty vote of thanks indeed to both of them for their contribution to the Society's proceedings.

The vote of thanks was carried with acclamation.

Vote of thanks to the President.—Mr. W. Perryman observed that it was his great pleasure and privilege to propose a vote of thanks to their President, not only for his conduct in the Chair that night, but during the

whole of the session—that being practically the last meeting. He thought they could congratulate Captain Dunlop Martin on the successful time the Society had had there during the session. (Hear, hear.) The meetings had been well attended and the proceedings well sustained, and they heartily congratulated the President on the result of the work he had done for them throughout his period of office. (Applause.) He hoped that there would be a good attendance on the occasion of the summer meeting at the President's home, on July 8th.

The proposition was passed with enthusiasm, and the meeting then terminated.

J. F. Macdonald, *Hon. Secretary.*

Veterinary Medical Association of Ireland.*

Demonstrations at the Dublin College.

A General Meeting of the Veterinary Medical Association of Ireland was held in the Veterinary College of Ireland, Dublin, on Wednesday, May 6th at 5.30 p.m., with the President (Professor J. J. O'Connor) in the Chair.

The following members and visitors were present:—Messrs: A. A. Donnelly, J. J. Cosgrove, N. Walsh, A. F. O'Dea, L. M. Magee, J. S. McCann, J. J. Condon, P. F. Dolan, R. H. Lambert, M. J. Ryan, T. Treacy, T. A. Mernagh, H. O'Leary, F. S. Ringwood, R. A. S. Coulter, P. A. Carroll, J. D. Nowlan, C. M. Griffin, F. A. Heney, J. D. Whitty, W. O'Callaghan, S. Conway, J. J. Geoghegan, E. V. Kelly, J. J. Lyons, V. E. Stack, H. V. O'Brien, J. F. Timoney, J. Lowndes, Mrs. J. Lowndes, Lieut.-Col. H. T. Ryan, Prof. W. Kearney, Prof. J. F. Craig and Prof. T. G. Browne.

Letters of apology for non-attendance were received from Messrs. P. J. Howard and J. V. Carroll.

A vote of sympathy was passed to Prof. Browne on the death of his brother-in-law.

Report of Council.

The following report of Meetings of Council was read and adopted.

"The Council beg to report as follows:—

"Council Meetings were held on February 9th, March 9th, April 14th, and April 27th. The principal matters discussed included: 1. The Veterinary Surgeons' Bill. 2. Fees and Allowances for the examination of horses, etc., employment being offered for a continuous period of four to six weeks: Fees for Veterinary Referees. 3. Vacancy for Veterinary Inspector in Co. Leitrim. 4. Correspondence with Irish Clean Milk Society *re* deputation to Dail. 5. Correspondence with Society for Prevention of Cruelty to Animals with regard to inclusion of Veterinary Surgeons' names on advertisements.

(1) Veterinary Surgeon's Bill.—This discussion hinged on Section 45 of the Bill, reports having been received that opposition was likely to be forthcoming to this Section. Several amendments were suggested to meet the difficulty and it was finally agreed to support the principle of the Government amendment standing in the name of Mr. Haslett. The amendment reads 'the provisions of the foregoing subsections shall not apply to any farmer, stock-owner or their employees performing any operations or administering medicine incidental to the usual care and management of livestock, provided always that such person does not hold himself out as a veterinary practitioner or charge fees for his services'—To be added at the end of Section 45.

A sub-committee was appointed, consisting of the President, Prof. Craig, Messrs. H. O'Leary, P. J. Howard, P. F. Dolan, to represent the Association when the Committee Stage of the Bill would be reached.

(2) Fees for the Examination of Horses, Etc.—Certain veterinary surgeons having been offered by the Department of Agriculture employment for a continuous period of four to six weeks examining horses, etc., at a remuneration of £2 12s. 6d. per day with a night allowance of 16s. and second class railway fare, were advised not to accept these terms. Practising members of the profession in the I.F.S. were circularised to the same effect.

It was decided to communicate with the Department as to the terms which would be acceptable and also to raise the question of fees for Veterinary Referees.

It was agreed that the following terms be demanded for a veterinary surgeon for the examination of horses, fillies and colts for the Department of Agriculture when employed for a continuous period of four to six weeks or for a shorter period, viz:

1. Three and a half guineas per day for his services.
2. Travelling and subsistence allowance as at present.
3. (*a*) When the veterinary surgeon has to leave home before 1 p.m., or does not arrive home until after 1 p.m., he shall be paid a whole day's fee.

(*b*) When the veterinary surgeon leaves home after 1 p.m. or arrives home before 1 p.m. he shall be paid a half day's fee for the time spent in travelling on the day that he is not engaged in examining a horse or horses.

Veterinary Referees.—It was agreed that the following terms be demanded for Veterinary Referees, *viz.*:—Five guineas per day when he can leave home and return on the same day and otherwise the fee be four guineas per day including the day he leaves home and the day he returns.

(4) Vacancy for Veterinary Inspector in Co. Leitrim.—This question was discussed and adjourned for further information.

(5) Correspondence with Irish Clean Milk Society.—Correspondence with the Irish Clean Milk Society was read and Mr. Dolan was appointed to act on a deputation of the Society to certain Members of the Dail to further legislation for the grading of milk.

(6) Correspondence with S.P.C.A. with regard to Inclusion of Veterinary Surgeons' Names on the Society's Posters and Advertisements.—The question of the inclusion of a veterinary surgeon's name on posters and cards issued by the Wicklow Branch of the Society having been raised, a ruling was given that this constituted advertising and arrangements were made to have the name omitted."

It was decided that the Councils' recommendations as to the scale of fees for veterinary surgeons examining horses, fillies and colts for the Department of Agriculture, and also the scale of fees for veterinary referees, be communicated to the Department with a request that these fees be paid to veterinary surgeons who are asked to perform these services.

Demonstrations.

The following demonstrations were given:—

1.—Treatment of Sterility in the Cow, by Professor J. F. Craig.

2.—Treatment of Stricture of the Teats in Cows, by Mr. A. A. Donnelly.

3.—Passing of the Stomach Tube in the Horse, by Mr. J. J. Cosgrove.

4.—Exhibition of Obstetrical Instruments, by Mr. F. J. Daly.

5.—Spinal (Epidural) Anæsthesia in Cattle, by Professor T. G. Browne.

6.—Demonstration of Double Intradermal Tuberculin Test, by Mr. Sean O'Donovan.

* Received for publication June 27th.

Spinal (Epidural) Anæsthesia in Cattle.

Professor T. G. Browne, in giving the demonstration on Spinal (Epidural) Anæsthesia in Cattle, said: "This method of anæsthesia has been extensively practised on the Continent of Europe and it has recently been introduced into Great Britain, but so far as I am aware it has not been adopted by any practitioner in Ireland. It consists in injecting a local anæsthetic (in the fluid state) into the posterior part of the vertebral canal, thereby anæsthesing the roots of the nerves coming from the posterior part of the spinal cord, so that the pelvis and to a greater or lesser extent the hind limbs are temporarily deprived of their nerve supply. The rectum and anus and the vagina and vulva become relaxed and lose their power of contraction, so that manipulations can be carried out *per rectum* or *per vaginam* without straining or evidence of pain on the part of the animal. There is partial loss of control of the hind limbs and the animal may be unable to stand if a large dose has been injected. It is claimed by those who have used this method of anæsthesia extensively that it is of valuable service in cases of dystokia or in reducing a prolapsed uterus or in amputating the uterus or in removing fœtal membranes, etc.

Some experience is necessary for regulating the quantity of the anæsthetic injected, so that the animal may not lose control of the hind limbs beyond the extent of being able to stand, unless the recumbent position be desirable. The extent of the body affected will depend on the quantity of the anæsthetic injected, for the more injected the further will it force its way forward in the vertebral canal and therefore the greater will be the extent of the posterior part of the body involved. The necessary quantity will vary to some extent according to the size and condition of the animal. In fat animals a little larger quantity is necessary, because there is more fat in the vertebral canal and this retards the passage forward of the anæsthetic. The anæsthetic is injected into the canal outside the coverings of the spinal cord; that is, into the space (epidural space) between the dura mater and the wall of the canal.

There are three sites recommended for making the injection: (1) between the last lumbar vertebra and the sacrum; (2) between the posterior extremity of the sacrum and the first coccygeal vertebra; (3) between the first and second coccygeal vertebræ. In the case of the first, the needle must be passed to a depth of about three inches and there is some danger of injuring the spinal cord. In the case of the other two sites the operation is much simpler and, it is claimed, gives equally good results as compared with the first. Here the needle does not require to be passed so deeply and there is no danger of injuring the spinal cord because the cord and its coverings do not extend so far backward in the vertebral canal; in fact, the canal here contains only a few nerves which run backward from the posterior part of the spinal cord before gaining exit through the intervertebral foramina. These two sites can be easily located by making out the depressions between the spinous processes, the sacro-coccygeal joint being easily recognised by moving the root of the tail from side to side. The needle should be inserted at the posterior part of the depression close to the spinous process behind the space and then directed downwards and forwards at an angle of about 60° with the horizontal, being careful to maintain its course in the middle line. When it has passed to a depth of about two inches in the case of the sacro-coccygeal space, and about one-and-a-half inches in the case of the space between the first and second coccygeal vertebræ, it will be found to strike the bony floor of the canal. When the canal has been entered the sensation of a needle entering a cavity is apparent, the resistance suddenly diminishing. If the point of the needle is in the canal the anæsthetic will flow in freely, very little pressure on the syringe being necessary. During insertion of the needle the tail should be held back by an assistant in a straight line with the vertebral column. All aseptic precautions should be observed. The site should be shaved and methylated spirit and ether applied."

The animal used for this demonstration was a cow a little larger than the Jersey size. The site selected was the space between the first and second coccygeal vertebræ. The needle was one of the large hypodermic type, two and a half inches long, and 1·8 mm. bore. A syringe was used as a handle to the needle. Messrs. Arnold and Sons have on the market a specially-made needle with a stilette (as demonstrated), but it has the great disadvantage of having no handle or means of grip to assist its control during insertion. The anæsthetic used was kindly supplied by Messrs. Parke Davis and Co., Ltd. It is a special preparation called "Parsetic" (preparation of Ethocaine and Adrenalin) supplied in two ounce bottles with rubber caps containing sufficient for four or five injections. The cost per bottle to veterinary surgeons is about 3s. 6d. The quantity injected was 10 c.c., but up to 30 c.c. may be used if the recumbent position be desirable. Within ten minutes from the time of injection the pelvic organs were manipulated *per rectum* and *per vaginam* without any attempt at straining on the part of the animal; the cow was unsteady on the hind limbs, but did not go down.

The duration of the maximum effect of this anæsthetic is about one hour and then it begins to pass off and has almost entirely disappeared by the end of the second hour. In those cases where the animal has a tendency to go down it is recommended that she should be in charge of one or more attendants to prevent her from injuring herself through struggling in her efforts to get up.

Demonstration of Double Intradermal Tuberculin Test.

The demonstration of the double intradermal tuberculin test was given by Mr. Sean O'Donovan. In this demonstration three subjects were exhibited, two cows showing completed positive reactions and a third which was negative. For the purpose of comparison and control all three were also inoculated with concentrated broth in a site adjacent to the tuberculin inoculation.

The animals were first inoculated on the previous Sunday evening, the second inoculation being made on Tuesday evening (48th hour) and the final readings were now shown at the meeting (72nd hour). Both reactors showed typical œdematous flat, plaque-like swellings, the difference between them and the sites at which the broth was inserted, as a contrast, being easily demonstrated. In the non-reactor there was no demonstrable difference. There was a great difference in the amount of pain shown by the two reactors, one evincing great sensibility to manipulation, while the other was much less painful. The point was stressed by the demonstrator that in nervous cattle, and it had been

experienced in Kerries, this pain test required caution. Skin measurements, heat and pain were helpful, but the diagnostic feature was the diffuse nature of the swelling.

The question of the doubtful reactor was then discussed and the demonstrator maintained that, no matter how dogmatic one may be that any departure from the normal negative swelling or any difference between the tuberculin and broth inoculations should be regarded as positive, one still met cases which should be classified as doubtful and treated as such.

Comparison with the subcutaneous test was discussed, points emphasised being the physical effects on the arm of taking a series of temperatures in a large herd of 50 or 60 cattle and the unreliability of temperatures in young pregnant cattle.

The technique of the actual inoculations was discussed and demonstrated, members being afforded the opportunity of inoculating broth in the live subject and also in a piece of fresh skin provided for the purpose. A suitable head lamp was shown which in any dark shed could be focussed on to the site, leaving the hands free for the inoculation. It was shown that the danger of inoculating too deeply through the skin was as slight as inoculating too superficially. When correctly inserted, one felt the pea-like swelling and, looking over the inoculations of a herd when completed, one could be doubly sure of correct insertion, as the inoculation showed up as a flat little swelling. Shaving was unnecessary and with short-haired animals clipping of just the actual site was all that was required.

In one of the cows under demonstration the sub-palpebral test was also used; in the other the ophthalmic test was applied. In the sub-palpebral test broth was used on the second eye as a contrast. The reaction was very distinct and evident, the broth inoculation showing no swelling whatever. The inoculations were made at the same time as the intradermic inoculations, four minims being used for each injection.

In the ophthalmic case the applications were also given at the same time as the intradermic injections and the readings were also made at the same time. At the 48th hour there was evidence of lacrymation and a small bead of pus. On the evening of the demonstration the condition was similar, lacrymation being distinct, but there being only a slight bead of pus.

Humane-Killers for Horses in Coal Mines.

The Secretary for Mines has made an order which widens the choice of appliances for the destruction in coal mines of horses suffering from injury or incurable disease. The order permits the use of appliances operated by the firing of a small cartridge of explosive (similar to revolver ammunition) but only such types of these appliances as have been subjected to stringent safety tests at the Mines Department testing-station and have been officially approved. The use of horse-killers operated by this method has not been allowed in mines where there may be a risk of explosion, because only "permitted" explosives may be taken into or used in such mines and the ammunition used is not a "permitted" explosive. Recent tests have shown, however, that it is possible to make this kind of horse-killer quite safe. The Secretary for Mines states that an instrument has been found which has passed the safety tests and has been approved.

Agricultural Research Council.

Names of the Members.

Dr. Addison, replying to Mr. Ede, in the House of Commons on July 6th, said that in July, 1930, a committee of the Privy Council, with the Lord President of the Council as chairman, was appointed under Order in Council "for the organisation and development of agricultural research." The Agricultural Research Council had been appointed by Royal Charter "for the purpose of furthering the objects of the said committee." The Council consisted in the first instance of 13 members, appointed either on account of their qualifications in one or other of the basic sciences underlying agriculture, or on account of their general experience of and interest in agriculture. The following gentlemen had accepted invitations to serve on the Council:—Dr. J. A. Arkwright, Sir Merrik Burrell, Dr. E. J. Butler, Professor E. P. Cathcart, Lord Richard Cavendish, Mr. Joseph F. Duncan, Sir John P. Farmer, Sir Daniel Hall, Sir F. Gowland Hopkins, Professor T. J. Mackie, Sir Thomas Middleton, Mr. Spencer Mount, and Professor D. M. S. Watson.

Danger of Tubercle in Milk.

Professor Buxton's Statistics.

Professor J. B. Buxton, of Cambridge, speaking at a recent conference of Agricultural Organisers at Cambridge, said that, in Aberdeen, of a number of samples of milk 5·5 per cent. were tuberculous. In 1929 samples from 697 country farms showed that 12·6 per cent. were sending tuberculous milk to Manchester, and the corresponding figure from London was 7·5 per cent. The average percentage of tuberculous milk in the great cities of England and Scotland was therefore about 7·36. Some of the variations in the percentages were due to the differences in the methods employed for detection of tubercle. Altogether there were over 1,000,000 tuberculous cows in England and Wales. Regardless of the ill-effects of animal tuberculosis on the public health this disease caused heavy financial loss to the livestock industry.

Dealing with the question of eradication Professor Buxton said such a scheme would certainly involve the slaughter of at least half the breeding and commercial cows in the country, and there would also have to be a constant weeding-out process. The tuberculin test was of great value in detecting dangerous animals, but there were at present only some 400 herds producing Grade A milk, and the education of the people was the only way in which the number of such herds could be increased. Owners of livestock might eliminate tuberculosis in a few years. A clinical examination should be carried out four times a year and tuberculous animals gradually eliminated; disinfection would also play a leading part. Bovine tuberculosis in England was responsible for few, if any, cases of pulmonary tuberculosis in human beings, but in Scotland several such cases had occurred. That was a startling revelation. Moreover, no existing system of vaccination afforded permanent protection.—*The Times.*

In Parliament.

The following questions and answers were recorded in the House of Commons recently :—

Foot-and-Mouth Disease.

Colonel Howard-Bury asked the Minister of Agriculture whether, seeing that the Irish Free State have a clean bill of health as regards foot-and-mouth disease, he can now relax the severity of the regulations forbidding the import of cattle from Southern Ireland;

(2) Whether, seeing that the period of incubation of foot-and-mouth disease is from four to six days, and that for all cattle a six days' detention is a statutory requirement, and seeing that after this detention outbreaks of foot-and-mouth disease appeared simultaneously in various places in England and at one place in Northern Ireland, he can yet state what was the cause of all the outbreaks; and will he investigate other possible causes of the outbreak, and in the meanwhile suspend the embargo against the importation of cattle from Ireland?

Dr. Addison: The evidence clearly shows that foot-and-mouth disease was introduced in Great Britain by cattle shipped from Belfast on June 10th to Heysham and Ayr. Some of these cattle came direct from premises on which, according to information furnished by the Minister of Agriculture for Northern Ireland, disease must have existed since the first week in June. According to the latest information received from Northern Ireland, the origin of the outbreak in that country has not yet been established. I am carefully considering the question whether any modification of the embargo on animals from Ireland can now be made with safety, and I will make an announcement as soon as possible.

Colonel Howard-Bury: Seeing that there has been no foot-and-mouth disease for many years past, and that it might come from some imported foreign substance, such as oats or, possibly, butter, will the right hon. Gentleman put an embargo on such foreign stuffs which might have led to the disease; until this country is completely clear?

Sir K. Wood: On a point of Order. Have you not forgotten, Mr. Speaker, to call my Question No. 48?

Colonel Howard-Bury: In my Question No. 55 I ask whether the right hon. Gentleman can say what was the origin of the disease, and I am now simply asking whether he could not put an embargo on certain substances which might have to do with it?

Mr. Speaker: That really does not arise out of the question on the Paper.

On June 3rd, Major Elliot asked the Minister of Agriculture whether he is now in a position to make any further statement with regard to the Standstill Order on foot-and-mouth disease, particularly as regards Scotland.

The Minister of Agriculture (Dr. Addison): If no outbreak of foot-and-mouth disease occurs in the meantime outside the existing infected areas, I propose to issue a further Order, the effect of which will be to remove the rest of Great Britain from the operation of the Standstill Order as from midday to-morrow, the 4th instant. This, however, will in no way affect Orders which are in operation in respect of the infected areas.

Information received from the Governments of Northern Ireland and the Irish Free State indicates that as a result of the fullest investigation, there is no evidence to show that infection has been conveyed outside the infected area of County Down, the whole of which has been subject to restrictions prohibiting the movement of animals therefrom since June 19th. Subject to this position remaining unaltered, I propose issuing an Order to operate from midnight to-morrow, the 4th instant, permitting the landing of fat stock from any part of Ireland outside the existing scheduled area for slaughter within 96 hours at certain landing places—Glasgow, Holyhead, Birkenhead and Cardiff.

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Grass Sickness (Horses).

Sir H. Hope asked the Secretary of State for Scotland whether he is aware of the outbreak of grass sickness amongst horses in Angus and neighbouring counties in Scotland; and whether the veterinary staff are devising any means for alleviating or checking the disease?

Mr. W. Adamson: The reply to the first part of the question is in the affimative. With regard to the second part, I would refer the hon. Member to the replies which I gave to the questions addressed to me on this subject by the hon. Member and by the Member for Eastern Aberdeenshire (Mr. Boothby) on July 8th and December 2nd last respectively. The Animal Diseases Research Association are actively continuing their research work with the object of ascertaining the cause of and possible preventive or curative treatment for this disease.

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Experiments (Living Animals).

Mr. Freeman asked the Home Secretary (1) whether any record is kept of the details of experiments on living animals which are mere repetitions of previous experiments and therefore useless for purposes of research; and, if not, whether he will consider the desirability of keeping such a record, to be published in his annual report, or of prohibiting such experiments altogether;

(2) Whether any record is kept of the number and details of experiments on living animals performed for demonstration purposes to students or for similar reasons; and, if not, whether he will consider the desirability of keeping such record and publishing this information in his annual report?

Mr. Clynes: I am not aware of any experiments which are mere repetitions of previous experiments, except the experiments performed not for purposes of research but for demonstration to students (*i.e.*, experiments under Certificate C). The number of these experiments is given each year in the report prefixed to the annual return. Special provision is made for these experiments by Section 3 of the Act, and I have no power to prohibit them. It is impracticable to publish details of experiments in the annual return.

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Livestock (Conveyance).

Mr. Duncan Millar asked the Minister of Agriculture what provision is made in Ireland for the cleansing and disinfecting of vehicles used for the carrying of livestock; and whether the same or similar regulations have been adopted in Ireland with respect to the conveyance of livestock by road and rail as are embodied in the Transit of Animals (Amendment) Order, 1930?

Dr. Addison: Under the general Orders of the Departments in Northern Ireland and the Irish Free State, similar provision, generally speaking, is made for the cleansing and disinfection of vehicles used for the conveyance of animals by road and rail in Ireland as is required by the Orders in force in Great Britain, including the Order specified by the hon. and learned Member.

Mr. Millar: Will the right hon. Gentleman supply the House with a copy of the Regulations that apply in Ireland?

Dr. Addison: I will try to supply the hon. Member with a copy.

"Dick" College Prize Distribution.

£30,000 Extension Scheme.

Report from "The Scotsman" of July 4th.

The need for extension of the Royal (Dick) Veterinary College, Edinburgh, was emphasised by Professor Sir T. Hudson Beare, chairman, at the annual distribution of prizes in the College yesterday, and he made an appeal for support of the scheme, which he estimated would cost about £30,000.

There was a claimant need in this country, he said, for veterinary surgeons. The farming community recognised that need. Just as people needed hospitals for the sick, they needed hospitals and surgeons for their animals. It was only in institutions like the College that they could hope to cope with the serious evil of the sickness of animals

and the tremendous loss it meant—such as the present outbreak of foot-and-mouth disease. The College itself must expand. Not so many years ago they came out of their cramped quarters and they thought they had a building which would meet their needs for a long time, but now they were inconveniently crowded. They must expand. Their hospital was not big enough, and there was not enough room for advanced teaching. They had a piece of ground adjoining the College, and they had a building scheme, but they could not start for lack of money, and he wanted to make a public appeal to the whole of Scotland for funds to enable the governing body of the College to start work on the necessary extensions for teaching laboratories, for research rooms, and for extension of their hospital for sick animals. They wanted something in the neighbourhood of £30,000 to get the scheme complete. He made his appeal to all those in Scotland who were lovers of animals and those who gained their livelihood from animals, and to the general community who realised how closely connected very often human and animal diseases were.

Principal Bradley, in reporting on the year's work, said he thought they might call it a Colonial session, because for the first time there had been put in operation part of the Lovat scheme. There had been elected a certain number of Colonial veterinary scholars, the aim being recruitment of suitable men for the Colonial veterinary service. That was one of the directions in which they might say a certain amount of progress had been made during the session. Associated with that, he ought to mention the institution by the University of a Diploma in Veterinary State Medicine. The two, taken together, justified the adjective he had suggested. Proceeding, Dr. Bradley said they only came into that building in 1916 but they were already so cramped that they must extend. It was compulsory on them at the present moment to hold two practical classes in the same laboratory, and any one who had any experience of teaching knew full well how extremely inconvenient that was. Lest there should be any misconception that they wanted to be luxurious and spend unnecessarily, he would point out that since the war the advanced teaching in the College had increased enormously. Not only did they prepare for the ordinary diploma of membership of the Royal College of Veterinary Surgeons, but they also prepared students in increasing numbers for the degree of B.Sc. of Veterinary Science, and for the D.V.S.M., and now for the training of veterinary officers for the Colonial service. Through the generosity of a kind friend of the College they might claim to have a rural branch from which might be studied the diseases of the larger farm animals, as distinct from the town animals with which they were more familiar in the hospital.

Sir Norman Walker, President of the Royal College of Physicians, who distributed the prizes, said that in a paper on "The Value of Medical and Veterinary Collaboration," Mr. Frederick Hobday said it would be better if veterinary surgeons knew more about human pathology and doctors more about animal diseases. Mr. Hobday used the word collaboration. He (Sir Norman Walker) had been in the habit of using co-operation, perhaps because in his visits to India he had been so impressed with the demerits of no co-operation. The words meant nearly the same thing, but Mr. Hobday had the support of the dictionary, which indicated that his word was more used in a literary or scientific sense, while his seemed to be wider in its application. But the difference was negligible; it was the action that mattered, and it could not be denied that their respective professions had made greater progress and done more for the public good since they began to work together. (Applause.)

There had been amazing progress in both professions in the last 50 years. It had often been said that the war might have ended differently if the doctors had not been successful in suppressing typhoid fever; so might it if the veterinary surgeons had not been able to suppress glanders. And these two terrible diseases had been brought under control by means of the knowledge gained by the study of bacteriology, a subject which was an integral part of both professions. There were other common diseases of great public importance where they had collaborated for the public good. Koch did his early work on tuberculosis on cattle. As a country doctor he had no imposing laboratory at his disposal. It was nearly 50 years since he had discovered the tubercle bacillus, and though much had been done—and Edinburgh had played a leading part in the work—they were far from being able to claim victory and must go on working together to that end. In much of the earlier part of the curriculum their students studied exactly the same subjects. Chemistry, biology, and physics were important to both; anatomy and physiology, though differing in detail, were the same in principles, and so on through the rest of the curriculum. The linking up of the Royal (Dick) College with the University was a great advance, and in the description of the courses for the B.Sc. one noted with satisfaction that the courses of study of the two professions closely approached.

He was a little tempted to discuss the different methods by which their professions were officially recognised as practitioners. They had only one portal of entry; the medical profession had 23, some of them wider than others. The system might be illogical, but in the British way it worked. (Laughter and applause.) Theirs was very logical, and perhaps required a closer acquaintance with law—with their instruction in which he had a hereditary interest. (Applause.) Addressing those who would immediately be qualified, and be going into practice, Sir Norman Walker said that he saw in that day's *Scotsman* some very sensible remarks by his friend the Principal of St. Andrews University. One heard to-day a great deal of research, and tended to associate with it imposing laboratories, microscopes, section cutting, and a bacteriological incubator. They were all important, but the observation of the general practitioner, carefully made and carefully recorded, was perhaps nearly as useful to the community, and certainly to the careful observer himself. The medical and veterinary practitioner in rural areas would both keep up their interest and raise the level of their work if they worked together. (Applause.)

At yesterday's ceremony a mace was used for the first time. It was the gift of Dr. R. Stewart MacDougall, a former member of the teaching staff, in memory of his wife.

Medallists and Prizewinners.

The following is a list of the medallists and prizewinners:—

	Silver Medals.	Bronze Medals.
Anatomy (Junior)	A. Robertson, B.Sc.	J. M. Rorrison.
Practical Anatomy	J. M. Rorrison...	—
Biology	A. Robertson ...	J. A. M'Kinnon.
Chemistry ...	J. A. M'Kinnon, B.Sc.	J. M. Rorrison.
Practical Chemistry	—	A. W. Taylor.
Anatomy (Senior)	J. M'P. Fraser ...	J. S. S. Inglis.
Practical Anatomy	J. M'P. Fraser ...	—
Physiology ...	J. M'P. Fraser ...	W. E. Lancaster, B.A.
Practical Physiology	—	A. W. Smith, A. Mair, B.Sc.
Zootechny ...	J. Graham, J. M'P. Fraser.	—
Materia Medica...	W. B. Forrest ...	J. P. Pickering.
Hygiene	J. P. Pickering...	W. B. Forrest.
Pathology ...	W. B. Forrest ...	J. P. Pickering.
Bacteriology ...	J. H. Blanchard	J. P. Pickering.
Medicine ...	J. Johnston ...	J. A. Taylor.
Surgery	J. Johnston ...	W. G. Edwards.
Obstetrics ...	J. A. Taylor ...	J. Johnston.
Parasitology ...	—	L. Dougal.
Clinique	J. Johnston ...	—

Macfarlane Medal (best aggregate)—J. Johnston.

Professor-Emeritus R. Stewart MacDougall Prize—A. Robertson, B.Sc.

Gemmell Scholars—G. C. Mackie and J. M'P. Fraser.

Hugh M'Callum Prize—W. B. Forrest.

Tindal Scholar, 1930-31—W. G. Robinson, B.Sc., M.R.C.V.S., D.V.S.M.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

July 17th.—Summer Meeting of the Mid-West and South Wales Division, N.V.M.A., at Hereford.

July 20th.—Meeting of the Editorial Committee, N.V.M.A., 2 Verulam Buildings, Gray's Inn, at 4.30 p.m.

July 22nd.—Summer Meeting of the Lancashire Division, N.V.M.A., at Crewe.

July 24th.—Summer Meeting of the Yorkshire Division, N.V.M.A., at Burley-in-Wharfedale.

Aug. 22nd-28th.—N.V.M.A. Congress at Norwich.

R.C.V.S. President.

At a meeting of Council, R.C.V.S., held at 10, Red Lion Square, London, on Friday, July 2nd, and a full report of which will appear in an early issue, Mr. George P. Male, M.R.C.V.S., of Reading, was elected President.

All our readers will unite with us in congratulating Mr. Male upon his well-deserved honour, and none more whole-heartedly than members of the N.V.M.A., for which body the new incumbent of the highest office in the profession has rendered such unstinting and able service.

Mr. Male has been a member of Council, R.C.V.S. for the past 12 years, and it is supremely fitting that the signally able service which he has rendered throughout that period to the governing body, with, may we say, particular reference to the interest of the general practitioner—which he has so much at heart—should have culminated in a call to the Chair, which, we are confident, he will fill with honour to himself and benefit to the Royal College of Veterinary Surgeons.

Major Abson's Successor.

The broadcast news bulletin that (for the first time and thanks to the N.V.M.A. publicity service) informed the world of the election of President, R.C.V.S., also related the election, on the same occasion, of Lieut.-Col. P. J. Simpson, of Maidenhead, as Hon. Treasurer of the Royal College in succession to Major Joseph Abson, of Sheffield.

Major Abson has rendered yeoman service over a considerable period of years (1924-1931) in as formidably difficult a field as can well be imagined: it is no secret in the profession that the state of the finances of the Royal College constitutes, through no fault of its own, one of the major problems confronting the governing body of the profession. Colonel Simpson, who is, of course, President of the N.V.M.A., has achieved distinction as gold digger-in-chief to the almost equally-harassed Victoria Veterinary Benevolent Fund, and he can be trusted not merely to conserve the slender financial resources of the R.C.V.S. but to leave no stone unturned in the vital task of placing them upon a satisfactory footing.

The Annual General Meeting.

Members are notified that the time of the holiday Annual General Meeting of the N.V.M.A. on Saturday, August 22nd, as announced in the Provincial Programme has been altered from 3 p.m. to 4 p.m.

Liverpool Examination Lists.

The following are the University of Liverpool, School of Veterinary Science, Examination Lists for July, 1931, in connection with the University Degrees of M.V.Sc. and B.V.Sc.

Degree of M.V.Sc.

Davies, G. O.

Degree of B.V.Sc.

Final Examination, *Part I.*—(*Passed in Individual Subjects*) Curtis, H. (*Vet Med., Vet. Surg.*). *Part II.*—(*Passed in Individual Subjects*) Sidhom, N. B. (*Hyg. of Milk & Meat, Tox. & Jurisp.*)

Third Examination, *Part II.*—Amos, Vera J. E.; *Part III*—Amos, Vera J. E., Marginson, J. C.

Second Examination, *Part II.*—Jenkins, E. D.

First Examination, *Part I.*—Edwards, G. B. (*Phys., Chem.*); Hey, T. E. (*Phys.*); Morton, Dorothy R.; Patchett, Edith R.; Wright, R. B. (*Chem.*). *Part II.*—Edwards, G. B.; Hey, T. E.; Morton, Dorothy R.; Patchett, Edith R.; Williams, Petronel L.; Wright, R. B.

Personal.

Mr. Eustace Montgomery Honoured.—We have much pleasure in announcing that His Majesty has graciously granted to Mr. Eustace Montgomery, M.R.C.V.S., Advisor in Animal Health to the Secretary of State for the Colonies, permission to wear the Brilliant Star of Zanzibar, conferred by His Highness the Sultan of Zanzibar for valuable services rendered to that Protectorate.

Birth.—Locke.—On July 1st, at 377, Wellington Road North, Heaton Chapel, to Mr. and Mrs. R. C. Locke, a son.

Marriage—Hale—Williams.—June 24th, at St. Paul's Church, Chippenham, by the Rev. F. M. Hookham (rector), and the Rev. A. F. Maltin (vicar of St. Saviour's, Redland, Bristol), Derrick Montagu Hale, M.R.C.V.S., younger son of the Rev. F. W. and Mrs. Hale, of "Penpole," Felixstowe, Suffolk, to Caryl Williams, younger daughter of Mr. G. H. Williams, M.R.C.V.S., and Mrs. Williams, of The Clift House, Chippenham.

Will.—Bostock, Major Arthur, late R.A.V.C. (78), of Bedford Park, W. (net personality £6,199) £6,278.

Appointments.—The Secretary of State for the Colonies has appointed Mr. A. J. James, M.R.C.V.S., as Veterinary Officer, Gold Coast, and Mr. H. S. Purchase, M.R.C.V.S., as Veterinary Officer, Northern Rhodesia.

Doctorate Degree.—We have pleasure in announcing that Hedley C. D. Golledge, F.R.C.V.S., has been successful in obtaining the degree of Doctor of Veterinary Science at the University of Zurich.

R.C.V.S. Obituary.

Clough, Francis William Smith, 8, Milton Place, Halifax, Yorks. Graduated New Edinburgh, December 17th, 1888. Died July 4th, 1931, aged 62 years.

Mr. R. J. Keall, M.R.C.V.S., Epworth.

"We regret to have to announce," says the *Goole Times* of June 26th, "the death of Mr. Robert John Keall,

veterinary surgeon, who had been in failing health for some time, and passed away in his sleep on Friday, at his residence, Burnham Road, Epworth. He was 84 years of age.

"A native of West Butterwick, Mr. Keall went from that village to Epworth when a youth. He studied at the Veterinary Surgeons' College, Edinburgh, and became a member of the Royal Society of Veterinary Surgeons. For nearly sixty years he carried on his practice in the district, where he was known and held in high esteem.

"Mr. Keall was the oldest member of the Wesleyan Society at Epworth. He had been actively connected with the church for much the greater part of his life and retained his interest in its work to the end. He had held various offices, had been a Society Steward, and a class leader many years. For well over 50 years he was a Sunday School teacher.

"Mr. Keall is survived by his wife and three sons."

Foot-and-Mouth Disease.

The Ministry of Agriculture announced on Tuesday last that the existence of foot-and-mouth disease had that day been confirmed on premises at West Wycombe, Bucks. The area affected by the consequent prohibition of movement of animals order comprises part of the counties of Buckinghamshire, Oxfordshire, Hertfordshire, and Berkshire.

Oxfordshire Zoo Opened.

The opening of the new Zoological Gardens in the neighbourhood of Oxford took place on July 3rd. The promoters, who have formed themselves into the Oxford Zoological Gardens Society, have converted a typical Oxfordshire farmhouse at Gosford Hill into a zoo, but have carefully avoided altering its original appearance. Gifts of animals have been received from the London, Bristol, Dublin, and Berlin Zoological Societies, and from individuals, but the recent outbreak of foot-and-mouth disease has prevented the installation of all the animals. Sir Peter Chalmers Mitchell performed the opening ceremony on the afternoon of that day.

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net.	*Post Free.*
	s. d.	*s. d.*
House of Lords Papers and Bills:—		
130.—Destructive Foreign Animals. (H.L.) To make provision for prohibiting or controlling the importation and the keeping within Great Britain of destructive foreign animals, for exterminating any such animals which may be at large and for purposes connected with the matters aforesaid	0 2	0 2½
Agriculture and Fisheries, Ministry of:—		
Leaflets (24-9999):—		
Advisory Leaflets:—		
16.—Coccidiosis in Poultry ...	0 1	0 1½
55.—The Lung Worms of the Pig ...	0 1	0 1½
56.—The Large Round-Worm of Pigs	0 1	0 1½
Statutory Rules and Orders, 1931:—		
521.—Coal Mines. Exptosives in Coal Mines (Horse Killers) Order, 1931, dated June 22nd, 1931	0 1	0 1½

An Okehampton farmer was shooting over his farm when he saw a large blackbird swoop down and kill a lamb. He shot the bird, and discovered that it was a raven, which measured 2ft. 4in. from tip to tip of its wings.

Diseases of Animals Acts, 1894 to 1927.

SUMMARY OF RETURNS.

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic Mange.§		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16 to 30 June, 1931	18	18	60	6,464	4	4	7	129	48
Corresponding period in—									
1930 ...	12	13	—	—	4	7	1	115	63
1929 ...	8	9	—	—	5	26	7	161	103
1928 ...	14	15	—	—	7	10	4	67	26
Total 1 Jan. to 30 June, 1931	281	298	65	6,979	86	151	184	1,063	435
Corresponding period in—									
1930 ...	221	235	—	—	142	212	256	1,387	552
1929 ...	241	273	23	1,895	140	302	331	1,038	577
1928 ...	320	357	102	8,655	195	399	287	918	458

Note.—The figures for the current year are approximate only.